RATIONAL ACCOUNTABILITY AND RATIONAL AUTONOMY IN ACADEMIC PRACTICE: AN EXTENDED CASE STUDY OF THE COMMUNICATIVE ETHIC OF INTERDISCIPLINARY SCIENCE

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ABSTRACT

This dissertation investigates the interaction of rational accountability and rational autonomy in interdisciplinary science within the university sector. It focuses on the cultural, social, and motivational forces that condition and limit the practices of academic researchers as they constitute and regulate interdisciplinary inquiry and conduct within the everyday world of the university sector. Findings are analyzed within an applied critical social theory framework that attends to the micro-level interaction of instrumental or purposive rational action and communicative or social rational action within the public spaces that are constitutive of the lifeworld of the university as a central public sphere in society. The research raises questions of how academics practice interdisciplinary science and how these practices relate to the reproduction of the regulative ideal of the university as a community that practices public reason.

Interdisciplinary science policies and practices are receiving strong endorsement as one response to demands for the increased accountability and relevance of academic practice within Canada's public university system. At the same time that the university system must respond to external demands for accountability and relevance it must reproduce itself as a public social institution that is open to the discursive redemption of contested validity claims that are both factual and normative. The study found that the medium for the discursive redemption of contested normative validity claims is participation in processes and procedures of practical argumentation within those social contexts of the lifeworld of the university that approximate the conditions of

participation in an ideal public sphere.

Using Burawoy's (1991) extended case study method as a strategy for operationalizing Habermas' theory of communicative action, two modes of constituting and regulating interdisciplinary inquiry and conduct within the university sector were found. Instrumental or purposive rational modes of constituting and regulating interdisciplinary inquiry and conduct were found to dominate in those social contexts where consensus on the goals and purposes of rational academic action were pre-existing and presupposed by participants in interdisciplinary inquiry and conduct. Communicative or social rational modes of constituting and regulating interdisciplinary inquiry and conduct were found to emerge to dominance in those social contexts where the goals and purposes of rational academic action were moved into a contested domain. In the contemporary historical context, questions concerning the goals and purposes of rational academic action in conditions of uncertainty and complexity have emerged as crucial issues for members of the university and society in general.

Academics participate in, but also contest the instrumental or purposive rational regulation of academic practice by using their constitutional autonomy and freedom to hold others accountable and demonstrate their rational disposition to realize mutual understanding on contested validity claims that are both factual and normative. In demonstrating a rational disposition to use their rational autonomy and freedom to realize mutual understanding on contested normative validity claims, public intellectuals realize a capacity to maintain and extend the conditions and limits of the practice of public reason within the university into the constitution and regulation of public spaces for the practice of reason in the lifeworld of society.

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DEDICATED TO

MY MOTHER

Winnifred Mary Robertson
(1922-1986)

AND

MY BROTHER

Leslie Wayne Robertson
(1951-1999)

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CHAPTER ONE
RECONSTRUCTING THE PUBLIC CHARACTER OF UNIVERSITY RESEARCH THROUGH INTERDISCIPLINARY SCIENCE

The public character of university research is a focus of political and intellectual debate in contemporary society (Edwards and Usher, 1997; Ostovich, 1995; Brown, Vecchia, and Schubert, 1995). Currently this debate is being framed as an encounter between opposing needs and interests. On the one side, government and industry are thematizing a need and interest to draw on the resources and capacities of university researchers to respond to, and manage the problems that confront modern society on a variety of dimensions and levels. On the other side, members of the academy are thematizing an interest and need to defend the freedom and autonomy of university researchers from the external imperatives of political, economic, and social forces (Giroux, 1995). The endorsement of interdisciplinary and policy relevant science as a "new" paradigm for university research is being advanced as both a normative and empirical response to these interrelated developments (Fairbairn and Fulton, 2000; Wallerstein, 1999; Hansson, 1999; Klein, 1996; Gibbons, et al., 1994). Integrative and interactive modes of knowledge production, proponents argue, are a means to reconstruct the public character of university research and revitalize public trust in the social responsibility of the university (Kazancigil, 1998; Giroux, 1995). Conspicuously absent from the interdisciplinary polemics is a systematic investigation of the cultural,

social, and motivational forces that condition and limit the practice of public reason in the social context of interdisciplinary science within the university (Ostovich, 1995; Klein, 1990). Specifically, there is a need to systematically investigate the issues that the historical forces and proposed responses are raising for the interaction of rational accountability and rational autonomy in interdisciplinary science within the university. The research in this study responds to this gap in the interdisciplinary discourse by investigating the processes and procedures that university researchers draw on, and develop, in the constitution and regulation of interdisciplinary inquiry and conduct within the university.

The institutional autonomy of the university in society is not fixed historically. Rather, it is an historically emergent process that is produced, reproduced, and transformed through the social actions and social relations that structure and mediate the practice of reason within the university. In Canada, public trust in the freedom and autonomy of the university has emerged from a process of mutual legitimation between universities and the federal and provincial levels of government (Axelrod, 1982; Newson and Buchbinder, 1988). As external guardian of the university, the state has assumed responsibility for creating a constitutional and fiscal environment for the reproduction of the university as a public institution that is self-governing, and relatively free from external political, economic, and social imperatives. The university has justified its claim to autonomy and public investment by invoking its internal constitution as a community of self-governing scholars who are committed to the overarching value of preserving, interpreting, producing, and transmitting scientific and scholarly knowledge. Throughout much of the twentieth century, this process of mutual

legitimation has fostered an ideal of the university as a public institution of exemplary rational character: the institutional embodiment of the dual forces of reason and democracy.

In the current historical context, there is mounting evidence to suggest that the ideal of an emancipated life grounded in the dual forces of reason and democracy has not been realized (Friedmann, 1987). This evidence confronts the public in the form of recurring economic, political, social, and environmental crises that have assumed global proportion. Both inside and outside of the university, these crises have engendered a growing skepticism about the capacity of formal reason to inform rational planning and development in a democratic society (Fischer, 1998; Dryzek, 1993; Jennings, 1987). As a public institution that justifies its claim to autonomy in terms of its capacity to practice autonomous reason and produce objective knowledge that serves the common good, the university is increasingly targeted as an institutional source, and solution, for modern crises.

At the same time that the university is being implicated in the crises of modern society, the institution has experienced recurring crises within its internal organization, and operation (Readings, 1996). In the latter portion of the twentieth century crises have emerged in the form of reduced access to public funding, tuition increases and uncertain enrolment trends, reduced capacity for infrastructure and faculty renewal, departmental closures, and increased public demand for productivity, accessibility, accountability, and relevance (Association of Universities and Colleges of Canada [AUCC], 1996). Alongside these political, economic, and administrative pressures, there is evidence of a growing uncertainty about the meaning and purpose of

autonomous reason within academic disciplines and the culture of the academy in general (Brown, Vecchia, and Schubert, 1995). It is within this context of uncertainty and disputation that the constitution and regulation of interdisciplinary science is receiving strong endorsement as a solution to contemporary crises; and severe criticism as a symptom of the crises it is intended to address.

Adopting a perspective informed by Jurgen Habermas' (1984) theory of communicative action, I conceive of the turn to interdisciplinary science as a "practical hypothesis" from which a reconstruction of the public character of university research can take its departure. As a "practical hypothesis", the trans-formative capacity of interdisciplinary science within the university cannot be determined *a priori*. Rather, it is an empirical question that calls for a social-theoretically informed analysis of the cultural, social, and motivational forces that constrain and enable the practice of interdisciplinary science within the university. Specifically, it is an empirical question whether the adoption of interdisciplinary science policies and practices are to be understood as an extension of historical efforts to instrumentalize and functionalize the university for particular and system interests; or as concrete opportunities to realize the university as a community that practices public reason in the service of common interests.

Within the framework of a theory of communicative action, processes of social evolution are conceptualized as two, analytically autonomous processes of learning (Ibid: 67-68). Through learning processes embodied in the development and use of scientific, technical, and organizational knowledge, instrumental rational capacities for securing the economic and administrative reproduction of society are realized. Through

learning processes embodied in the development and universalization of moral-practical knowledge, communicative rational capacities for establishing new principles of social integration are extended and interests in the symbolic reproduction of society realized. In the historical interplay of these two societal learning processes, structural imbalances between the material and symbolic reproduction of society generate crises that are experienced as losses of meaning, solidarity, and identity. Resolving these crises in the form of new levels of social integration is understood to depend upon a society's capacity to learn and institutionalize new principles of social coordination. Within the framework of a theory of communicative action, the university community is not considered to be a fixed, institutional embodiment of exemplary rational character. Rather, it is conceptualized as a regulative ideal that is embodied in the communicative practices of social actors; an ideal that is in a constant process of realization within contexts of historical determination.

The dissertation addresses the problem of how a community that practices public reason is realized, or impeded, through transformations brought about in the discursive learning processes that circulate within interdisciplinary science in the university. The dissertation investigates the conditions that constrain and enable the realization of this ideal through an examination of interdisciplinary science as a system and a lifeworld within the university. A form of critical ethnography called the extended case study method (Burawoy, 1991) is used to investigate this problem. The purpose of the research is to investigate the interaction of rational accountability and rational autonomy within the university sector by reconstructing the multi-dimensional rationality of discursive learning processes that constitute and regulate academic

practice in the social context of interdisciplinary science. The remainder of this chapter elaborates social and cultural conditions related to the endorsement of interdisciplinary science as a means to revitalize public trust in the public character of university research in modern society.

1.1. Constructing the National Character of Canada's University System

The social responsibility of the university is a conceptual category that is rich in meaning and subject to multiple, and competing interpretations. Historically, the Canadian state has played a central role in managing these competing interpretations through its constitution of a national university system that is justified to the public in terms of its capacity to serve the common interests of the nation, and the particular interests of regions within the nation (Newson and Buchbinder, 1988). Within this framework, the social responsibility of the university has been conceptualized narrowly as a public institution that serves the economic and moral development of the nation and its citizens through the internal activities of science and scholarship. The conception of university public service as a residual product of autonomous academic practice has allowed for the integration and realization of particular and competing interests under a mantle of common understanding and purpose.

Canada's university system originated as a cadre of denominational colleges catering to the privileged elite. In the early 1900s, these colleges divested their denominational ties to access public funds, and respond to emergent bourgeois interests in the practical and professional benefits of university education (Axelrod, 1982). Prior to World War II, the social character of the university system reflected the interests of the relatively privileged and bourgeois publics. During this period, the government and

the general public exhibited relative ambivalence toward the functional potential of university research to serve national and public interests (de la Mothe and Paquet, 1994).

In the post World War II era, university expansion was a phenomenon that characterized Western industrialized nations (Wotherspoon, 2000; Habermas, 1994; Mori and Burke, 1989). The expansion was fueled by the combined forces of democracy, industrialization, and science. In Canada, these forces were expressed in the hegemony of liberal-democratic ideologies, Keynesian economic and social welfare policies, and unprecedented interest in the production and technical exploitation of scientific knowledge for industrial, administrative, and individual interests. Between the late 1950s and the early 1970s, Canadian universities were transformed from an elite, to a mass system of research and education (Scott, 1995). During this period, public trust in university service was not forged in terms of the internal objectives of the traditional university. Rather, it was tied to the anticipated benefits of academic research and post secondary education for the nation and its citizens (Newson and Buchbinder, 1988). The realization of those benefits in the form of technically exploitable knowledge, professional qualifications, and transformations in physical and social environments is a matter of public record that is widely acknowledged.

As the university gained status as a productive force in society, the internal organization, operation, and self-understanding of the university were transformed. These transformations were manifest in processes of internal differentiation, specialization, and professionalization in both the academic and administrative dimensions of the university (Rossides, 1998; Fisher, 1990). Underpinning, and

overarching these processes was the ascendancy of positive scientific research and technique as a productive force, and as a normative model for academic practice and university service. In the context of expansion and relative prosperity, value conflicts and tensions resulting from the structural and ideological transformations could be managed, or masked (Newson and Buchbinder, 1988).

Since the early 1970s, Canadian universities and their counterparts in other Western industrialized nations have been confronted with significantly transformed fiscal, policy, and social environments (Brown, Vecchia, and Schubert, 1995). Specifically, neo-conservative ideologies and policies have emerged to displace the prevailing liberal ideologies and Keynesian policy frameworks of the expansionary period (Newson and Buchbinder, 1988). A corresponding emphasis on fiscal austerity in social spending, increased public investment in the private sector, and increased competition for declining public funds have placed universities in uncertain, precarious, and contradictory positions (Jameson and Pedersen, 1997; AUCC, 1996). Restructuring, reorganizing, downsizing, and forging new partnerships with new stakeholders are forces that are increasingly shaping the public character of university research. In this context, value conflicts and structural tensions have become increasingly difficult to reconcile, manage, or defuse.

The escalation of internal pressures, tensions, and conflicts have emerged within a broader historical context of recurring and emergent contestations over the economic, social and cultural interests that are shaping the formation of the Canadian nation. In the contemporary context, these contestations are increasingly recognized and experienced as a constellation of contradictions (Edwards and Usher, 1997). The

contradictions are manifest in the form of processes of: economic globalization and localization; processes of cultural convergence and specification; and processes of Gemeinschaft (community) and Gesellschaft (competition). Ironically, while the historical ideal of realizing a nation of common understanding and purpose remains elusive in the Canadian context, the university system is being challenged to increase its functional accountability, relevance and responsibility to the instrumental needs and interests that have achieved hegemony within the economic and political subsystems of the nation.

1.2. De-Constructing the Cultural Character of Academic Practice Within the University

Within the academic community, the social responsibility of the university has been traditionally conceptualized to include and extend beyond those functions that connect the university to national and private interests. Within the everyday world of academic practice, constituents of the university are expected to learn to assume additional responsibilities that constitute and reproduce the university as a social and cultural community of free and autonomous reason. These responsibilities include: the preservation, interpretation, and development of cultural traditions (cultural reproduction); the cultivation and development of ethical attitudes and attributes (social integration); and the formation of a reflective consciousness (identity formation) (Habermas, 1971).

In the traditional university these extra-functional responsibilities were integrated within the overarching value sphere of theology. The secularization of the university was a force, and effect of the rise of metaphysical reason and the integration

of the university into society as a public institution. In the modern university, challenges to the normative validity claims of metaphysical and philosophical foundations for the unity of knowledge, along with the expansion of the university community and the differentiation of faculties of knowledge into scientific, moral practical, and aesthetic spheres of value have contributed to the fragmentation and rationalization of the university and its scholarly community (Seidman, 1989). In combination, these developments have raised serious questions about the university's capacity to perform its extra-functional responsibilities as a social and cultural community. In the contemporary intellectual and political climate, these questions are becoming increasingly salient. One of the reasons for this is a reinvigorated critique of Western philosophical traditions, and the radical rejection of notions of universal reason and rationality as inherently anti-democratic. The latter development has raised fundamental questions about the rational autonomy and moral authority of the university in a social order that is characterized by complexity, diversity, and plurality. Challenges to the autonomy and authority of the university and demands for increased functional relevance have coalesced to engender a perceived crisis in the public character of university research. One of the responses to this situation is the endorsement of interdisciplinary science as a means to reconstruct the public character of university research and revitalize public trust in the social accountability and responsibility of the university.

1.2. Reconstructing the Public Character of University Research: The Disunities of the Interdisciplinary Science Discourse

Divergent cultural and social demands, shifting government priorities, and

globalizing competition are creating contradictory conditions for reconstructing the public character of university research through interdisciplinary science. These contradictions and tensions are apparent in the justifications that are offered for adopting different models of interdisciplinary science within the university sector.

An instrumental rational model of interdisciplinary science is being endorsed and advocated by those who seek to reunify theory and practice in a direction that will enhance the functional accountability, relevance, and responsibility of the university to the economic and political subsystems of society. Arguments for an instrumental rational model of interdisciplinary science tend to presuppose that the needs and interests of the university and its constituents, the needs and interests of the economic and political subsystems, and the needs and interests of society are coextensive and fundamentally harmonious. Within this framework, interdisciplinary science is advocated as a strategic response to problems both inside and outside the university. Overall, the adoption of interdisciplinary science policy is portrayed as a means to add value to university research, rather than as a replacement for conventional academic practice (Gibbons, et al., 1994).

Various models of post, non and anti-disciplinary practices are being advocated by those who seek to realize the disunity of theory and practice and displace the cultural hegemony of modern notions of objective reason and universal morality. Particular arguments in the counter-discourse of interdisciplinary science policy defy easy classification. In the extreme, notions of objective reason and universal morality are portrayed as fundamentally corrupt and antagonistic to the pluralistic values of difference, freedom, autonomy, and plurality that characterize contemporary society.

Advocates for a more moderate standpoint, promote a selective rejection of those aspects of objective science and universal moral-practical reason that conflict with, and suppress the interests and needs of particular social agents in society. Specifically, moderates argue for a selective critique of modern reason from the perspective of social agents who have been socially marginalized and excluded from full participation in the economic and political subsystems that have emerged to dominance in modern society. The convergence of these contradictory standpoints within the category of interdisciplinary science are confronting the university and its constituents with fundamental anomalies, and limited alternatives for revitalizing public trust in the public character of university research. Three primary responses to these challenges are evident in the contemporary discourse.

Defenders of an ideal university that stands apart from society tend to dismiss the adoption of interdisciplinary science policy as an ill-conceived and corrupting influence within the academy. Their response to endorsements for interdisciplinary science within the university is to lament the loss of traditional academic values and retreat into the idealism of the ivory tower (Ostovich, 1995). Given the historical ties that have been established among the state, industry, society, and the university, this option appears to be unrealistic. Retreat would clearly jeopardize the material reproduction of the university in society. More likely, it would allow for particular and system interests to instrumentalize and functionalize the university through the back door. At the other extreme, entrepreneurialists and technocrats view interdisciplinary science policy as a realistic adaptation to both internal and external forces. They argue for a reinstatement and extension of the functional and instrumental value of positive

science and technology as a means to extend and realize the productive capacity of the university. Given this option, the instrumentalizing and functionalizing forces of particular and system interests are to be invited in through the front door. Those who advocate for the adoption of interdisciplinary science policy as a means to negate the positive value of objective knowledge and universal morality in the name of a common interest in realizing individual interests appear to offer the university no option at all. Specifically, it is not clear how the radical negation of reason as inherently particularistic, or systemic will allow for the material and symbolic reproduction of the university as a public institution that serves common interests. Further, it is not clear how an escape into an aesthetic and ill defined future is different from a retreat into an ideal and ideological past. Conceivably, such an option would contribute to a polarization of the university community that would allow particular interests to functionalize and instrumentalize the university through both front, and back doors. None of these responses appear to bode well for the revitalization of public trust in the public character of university research.

In the contemporary context, one anomaly persists that merits systematic investigation. Simply put, the university continues to reproduce itself as a community that produces scientific and moral-practical knowledge that is both affirmative, and critical of the society in which it is embedded. Given the historical fact that the university has always experienced internal tensions, and has never existed in absolute isolation from external ties and trusts, the empirical reproduction of this dual capacity is not easily dismissed. Specifically, it is an empirical anomaly that warrants systematic investigation if the interaction of rational autonomy and rational accountability are to be

reconciled in current efforts to reconstruct the public character of university research through interdisciplinary science policy.

1.4. Statement of the Research Problem and Question

Given contradictory conceptions of the meaning and value of interdisciplinary science policy for reconstructing the public character of university research, the social, cultural, and motivational forces that constitute and regulate interdisciplinary science as a field of academic practice within the university need to be made problematic. This is particularly the case if the forms of rationality that inform and mediate the discursive learning processes that constitute and regulate interdisciplinary science within the university are to be made explicit. As social scientists, we know very little about how social and political relations are produced, reproduced, and transformed through the everyday communicative actions of academics within the university. We also know very little about how these communicative actions connect to the institutional setting of the university, and to the macro-level structures that establish the social context for the material and symbolic reproduction of universities in society. Theoretically, I posit that the public character of university research is the historical outcome of communicative actions oriented to the production of a rational consensus that is grounded in an ideal of achieving mutual understanding on disputed validity claims in practical contexts of social action. This hypothesis calls for an empirically grounded investigation into the forms of rationality that constitute and regulate academic discursive practices in their contexts of historical determination.

A central task of Habermas' critical social theory is to stimulate awareness and understanding in lifeworld contexts that are systematically threatened by the system

conforming effects of money and power. Because the university is increasingly perceived to be a useful institution for the realization of particular and system interests, it is important to learn how these social and political interests are addressed at the level of academic practice within the university community. The research question posed in this dissertation is: How do academics practice interdisciplinary science, and how do these concrete practices relate to the reproduction of the regulative ideal of the university as a community that practices public reason?

A number of sub-questions emerge from the general research question. Specifically, what processes, procedures, and strategies mediate academic practice, and what are their effects? How do academics make decisions about costs, benefits, and compromises in their various roles as researchers, academic mentors, and public intellectuals? In these various roles, how do academics form allegiances and maintain loyalties? Similarly, how do they express their trustworthiness and integrity to others in the variety of public spheres that constitute academic work within a university? In sum, how do academics create, maintain, and transform their social and political relationships as carriers of public reason, and how do these practices reproduce and transform the university as a community that practices public reason?

An external historical account of efforts to coordinate university and academic practice is inadequate to respond to the questions posed. A selective and strategic overview of the historical and institutional context of interdisciplinary science policy is important, however, to elaborate the situational context that frames academic practice in interdisciplinary science within the contemporary university setting.

The social rational basis for asserting an ethical position for the practice of

public reason in interdisciplinary science within the university is a central focus of this study. Rather than remain at the level of meta-conceptual debate, the dissertation makes the processes and procedures of academic practice problematic as they occur in the lifeworld of the university. The theoretical debates informing the research are elaborated in Chapter Two. The next section highlights and discusses the central concepts that organize the research.

1.5. The Main Theoretical Concepts and Relationships

To this point, "the university", "the state" and "community" are terms that have been used in a general and static way. For the purpose of the research, the meaning and use of these terms needs to be clarified. The university and the state are not intended to refer to fixed or monolithic entities. Rather, they are used to refer to the external embodiments of social and political processes as well as institutionalized, organizational forms. As the external embodiments of these processes and forms they are understood in a non-reified way as dynamic, fluid, and historically emergent. Similarly, community is not understood to exist in a fixed and determinant form. Rather, communities are viewed as public social spaces that are shifting and transforming in relation to multiple internal and external forces that structure and organize the social practices and relations of participants at any particular point in time. A central objective in this research is to investigate how relations between the need for rational accountability, and interests in practicing rational autonomy are constituted and regulated through the communicative actions of university researchers involved in interdisciplinary science practice.

1.5.1. The University and its Publics

As the external embodiment of a community that practices public reason, the university is a public institution that interacts with multiple internal and external publics. These interactions occur through multiple channels and are accomplished using various media in a variety of public spaces. In this research, the internal and external public spaces of the university are analytically sorted in terms of those that are constituted and regulated as monological public spaces, and those that are constituted and regulated as dialogical public spaces. The boundaries between and among these structuring forces are viewed in conceptual, as opposed to empirical terms. They are also viewed as inter-related and overlapping to various degrees in any concrete instance or situation.

For example, a university seminar is a relatively open and public social space within the university where internal and external publics are free to interact. A seminar is also a public social space within the university in which participants are encouraged to constitute and regulate their communicative actions in a dialogical, as opposed to a monological form. In other words, participants are encouraged to establish communicative social relations that are oriented to realizing and advancing their mutual understanding of a common problem. The administration of a structured interview to a research subject, on the other hand, is a circumscribed public social space within the university that is conventionally constituted and regulated in a form that is more likely to be monological, than dialogical. The researcher in this social situation is discouraged from establishing a communicative social relation with the research subject in order to extract information from the research subject which conforms to the objective validity

criteria of the scientific method.

Within a Habermasian perspective:

> The importance of the public sphere lies in its potential as a mode of societal integration. Public discourse...is a possible mode of coordination of human life, as are state power and market economies. But money and power are non-discursive modes of coordination....; they offer no intrinsic openings to the identification of reason and will, and they suffer from tendencies toward domination and reification (Calhoun, 1996:6).

The communication media that establish a focus for the research are primarily discursive. However, discursive and non-discursive media are co-existing to some extent in all public social spaces. Given the constitution and governance of a seminar situation, the media of communication are expected to be primarily discursive in form and effect. In practice, however, the seminar setting and process does not preclude the non-discursive exercise of power by virtue of the fact that participants occupy different statuses and perform different roles within a common social setting. Investigating the actual use of discursive and non-discursive media of communication in the various public spaces of the university is an important dimension in the overall investigation of the reproduction of the university as a community that practices public reason.

1.5.2. Communicative Rationality

Habermas' (1984) theory of communicative action provides a multi-dimensional concept of reason and a multi-level concept of social rationality. His expanded framework of reason and rationality is instructive for examining the multi-dimensional complexity of the public character of university research, as it is constituted within the multiple public social spaces of academic practice. In moving from a paradigm of

instrumental or purposive rational action, to a paradigm of communicative rational action, an opportunity is created for investigating both system functional and lifeworld extra-functional dimensions of academic practice. As described by Habermas (1984:392):

> The phenomena in need of explication are no longer, in and of themselves, the knowledge and mastery of an objective nature, but the intersubjectivity of possible understanding and agreement—at both the interpersonal and intrapsychic levels. The focus of investigation thereby shifts from cognitive-instrumental rationality to communicative rationality. And what is paradigmatic for the latter is not the relation of a solitary subject to something in the objective world that can be represented and manipulated, but the intersubjective relation that speaking and acting subjects take up when they come to an understanding with one another about something. In doing so, communicative actors move in the medium of natural language, draw upon culturally transmitted interpretations, and relate simultaneously to something in the one objective world, something in their common social world, and something in each's own subjective world.

According to Forester (1992: 62), fieldwork within a paradigm of communicative rationality allows us to shift from the perspective of external observer to:

> ...'look and see', neither to assume determinate structures *a priori* nor to expect any idealized discourse, but rather to shift from abstract discussions of truth and power, discourse and Other, to assess flows of action that reshape our beliefs, consent, trust and even more subtle frameworks of attention.

1.5.3. Critical Argumentation within a Public Sphere

The medium of communicative rationality is critical argumentation within a public sphere. In developing a theory of argumentation, Habermas (1984: 25)

identifies three dimensions of argumentation. As process, argumentation is a reflective means to achieve mutual understanding. As procedure, argumentation refers to a form of interaction that is normatively regulated. The task of argumentation is to produce arguments that are logical and cogent. In sum, argumentation is "the means by which intersubjective recognition of a proponent's hypothetically raised validity claim can be brought about and opinion thereby transformed into knowledge" (Ibid). The capacity for a participant to adopt an impartial standpoint within argumentation is related to the discursive conditions for redeeming validity claims. These conditions are such that participants may: "thematize a problematic validity claim, and, relieved of the pressure of action and experience, in a hypothetical attitude, test with reasons, and only with reasons, whether the claim defended by the proponents rightfully stands or not" (Ibid). The elements of a general theory of argumentation provide a conceptual framework within which to "look and see" how academic practice is produced within the public social spaces of the university and how these practices reproduce the university as a community that practices public reason.

1.6. Statement of the Thesis

The dissertation advances the knowledge claim that real potentials for realizing the regulative ideal of a university that practices public reason are available in the constitution and regulation of public spaces that enable conscious rational dispositions to coordinate interdisciplinary science as applied critical social theory. Specifically, the dissertation argues that the interaction of rational accountability and rational autonomy in academic practice is shaped by, and shapes the public character of university reason through processes of communicative action consciously oriented to achieving mutual

understanding on factual, normative and expressive validity claims. These processes arise from the fundamental presupposition that all social learning processes are anchored in communication. In the ideal university, multiple learning processes and their corresponding functions are socially coordinated in the form of critical argumentation within general and specialized public spaces. The impartial and universal content of academic argumentation in the specialized public spheres of the university expresses the norms of scientific and philosophical modes of inquiry that are open and ongoing. These norms share in the regulative ideal of achieving mutual understanding on problematic validity claims among a group of peers who are interested in the practice of critical reflection. Interest in achieving mutual understanding on problematic validity claims is also the regulative ideal that grounds the democratic form of inquiry and conduct among citizens in the political public sphere. At the level of critical argumentation, the structure of the scientific rational character of university reason and the public rational character of university reason in a democratic society are isomorphic. Processes of critical argumentation oriented to mutual understanding in ideal contexts presuppose that the structure of public communication excludes all force other than the force of the better argument. Processes of critical argumentation oriented to mutual understanding in actual contexts are subject to cultural, social, and motivational forces that structure, but do not pre-determine the outcomes of actual argumentation.

Economically and administratively the state intervenes into the university system to regulate university service and realize its interests in exploiting the functional and instrumental potentials of academic practice within the university. As a relatively

autonomous subsystem of the state, the university uses its internal economic and administrative powers to realize its interests in maintaining an affirmative relation to the public through its social relations with the subsystems of the state and the economy. At the same time that the university must respond to external demands, it must reproduce its social and cultural character as a guardian of reason and autonomy. The medium for realizing the former interest is instrumental or purposive rational action. The medium for realizing the latter interest is communicative rational action. Within the general public spheres of the university, academics use the power of public communicative reason to build and maintain the public rational character of the university as a community that practices public reason. In the specialized public spheres of the university, academics use the power of public communicative reason to realize the specialized rational capacity of the various value spheres that constitute the community of university reason. It is the communicative form of public argumentation in both the general and specialized public spheres of the university that constitute and regulate the interaction of rational accountability and rational autonomy in academic practice within the university.

Interdisciplinary science organized in university form is not a fixed, or pre-determined goal. Rather, it is a "practical hypothesis" through which participants in the university and society can realize an opportunity to reach a mutual understanding about themselves in the ongoing processes of cultural and societal modernization. A summary of the central arguments of the dissertation are set out below.

1.6.1. Systems of Accountability: Science and Society

Systems and instrumentalist models of interdisciplinary science tend to view

academic practice in terms of the system functional role of academics and the instrumental potentials of formal knowledge. Academics are viewed as operating within a bifurcated domain of reason and rationality that posits a diametric opposition between subject and object, theory and practice, knowledge and action. These approaches presuppose the lifeworld extra-functional practices of academics that produce, reproduce, and extend social and cultural relations within the university, and between the university and society. Within these models there is a failure to investigate and clarify how the university reproduces itself in society as a community that practices public reason. This failure leads to a misunderstanding of the ethical position of progressive academic practice that exhibits the form of a revitalized scientism.

On the political and academic right, public trust in the university is portrayed in narrow and functionalist terms that emphasize the functional and instrumental effects of academic practice. In this perspective:

> ...the university [is] a factory turning out, producing, making knowledge and workers as its product. This type of university would be less concerned with grounding its activity in the kind of self-understanding that had characterized past university life and more concerned with integrating itself into social systems of production. University autonomy would be a matter of de-politicizing university education in order to concentrate on the business at hand. Efficiency of production would be the university's goal (Ostovich, 1995).

Although de-politicized, the university would not be politically innocent. "It could pay for its unreflected relation to practice by stabilizing implicit professional standards, cultural traditions, and forms of political consciousness, whose power expands in an uncontrolled manner precisely when they are not chosen but result instead from the

ongoing character of existing institutions" (Habermas, 1994: 4).

The radical rejection of reason as a regulative model of rational accountability and rational autonomy within the university also adopts a narrow conception of the public rational character of the university in terms of its functional and instrumental effects in society. In this perspective, the university is transformed into an arena of ongoing political struggle among the irreconcilable standpoints of historical social agents. A thoroughly politicized and polarized university would lose its capacity to realize the rational capacity of its value spheres. It would also lose its capacity as a resource for the further democratization of society through the extension of public reason and the enrichment of discursive will formation in the political public sphere. These approaches lead to a misunderstanding of the ethical position of progressive academic practice that exhibits the form of a revitalized historicism.

1.6.2. Practicing Applied Critical Social Theory as the Lifeworld of the University

The dissertation takes as problematic the practices and processes of rational accountability and rational autonomy that reproduce the university as a community that practices public reason. It investigates the social rational basis for reasserting an ethical position for progressive academic practice in contemporary society. Constitutionally, the university is mandated to contribute to the economic and moral development of the nation and society. This mandate is only partially realized through the production and transfer of technically exploitable knowledge. At the same time that the university must reproduce itself as a functional institution in society, it must also reproduce itself as a social and political community. To the extent that its capacity to reproduce itself as a

social and political community is eroded by the forces of functionalist and instrumentalist reason, the university loses its social rational character as a community that practices public reason.

The function of communicative reason in the lifeworld of the university has tended to be ignored, or presupposed in the contemporary interdisciplinary science discourse. When these functions are problematized, it becomes apparent that the practice of communicative reason in public spaces is the lifeworld of the university. To the extent that interdisciplinary science is selectively constituted and regulated in the form of functionalist, instrumentalist, or strategic rationality the potential for realizing the power of communicative reason is cut off. To the extent that interdisciplinary conduct and inquiry is constituted and governed in the form of applied critical social theory, a potential for the release of the power of communicative reason is realized and a balance between the interaction of rational accountability and rational autonomy in academic practice is achieved.

1.7. Significance and Importance of the Study

To comprehend the interaction of rational accountability and rational autonomy in academic practice within interdisciplinary science, the constitution and regulation of the intersubjective world of discursive will formation within the university sector must be investigated. The extended case study method (Burawoy, 1991) is a form of critical ethnography that links the micro-level observations of everyday social interactions, to the macro-level generalizations of theory and practice. It permits the researcher to learn about processes and procedures of discursive will formation in their historical contexts of determination, and to learn from those practices in our ongoing efforts to improve the

theoretical and practical implications of practicing public reason. The analysis of exemplary processes and procedures for constituting and regulating interdisciplinary science in the case investigated in this study contributes to efforts to learn how to reconcile the interaction of rational accountability and rational autonomy in academic practice through the institutionalization of practices that are consciously grounded in a paradigm of communicative reason.

Investigating the interaction of rational accountability and rational autonomy in the practice of interdisciplinary science is important for its potential contribution to extending dialogical relations among the intellectual and theoretical discourses that circulate within the academy. In the contemporary context, the constitution and regulation of these dialogical relations tend to be encapsulated within disciplines, and within the sub-specialties that constitute the disciplines. Drawing attention to the contemporary situation of theoretical discourses within the domain of social theory, Habermas (1989: 77) has observed that,

> "We cannot even say that [the social theoretical perspectives] are in competition, for they scarcely have anything to say to one another. Efforts at theory comparison do not issue in reciprocal critique; fruitful critique that might foster a common undertaking can hardly be developed across these distances, but at most within one or another camp."

Habermas attributes this situation of "mutual incomprehension" to a tendency to unconsciously sever the ties of the academic system from its roots in the ideal communication community of the lifeworld of the traditional university. Investigating the real conditions and limits for reconstituting the ideal conditions of communication communities within the contemporary university is an important step

toward reclaiming the positive potentials of reciprocal critique oriented to a common interest and common undertaking.

Investigating the real conditions of the interaction of rational accountability and rational autonomy within the academy is also important for its potential to contribute to realizing the societal significance of the university through efforts to extend the processes and procedures of university learning processes into society. Learning to consciously reconstitute the ties between the university system and its roots in the lifeworld of society is an important step toward extending the processes and procedures of social learning both within the university and within society.

1.8. Conclusion

The main arguments of the thesis have been set out in this chapter. To understand the social rational basis for reasserting an ethical position for academic practice as public reason, the social character of university autonomy and academic conduct must be problematized within a comprehensive framework of reason and rationality. The dissertation views the social coordination of academic practice through interdisciplinary science policy as an example of ongoing processes of societal and cultural modernization. The reform and renewal of the public character of the university through interdisciplinary science practice is not understood as a straightforward adaptation to external pressures, or evidence of a qualitatively new paradigm for academic science. Rather, the transformative capacity of interdisciplinary science policy and practice is understood more modestly, as an opportunity to participate in and expand the public sphere of the university in society.

This chapter outlined the major arguments of the dissertation. Chapter Two

provides a review of relevant literature with a particular emphasis on meta-theoretical debates that frame and inform contemporary controversies over the ethical standpoint of progressive academic practice. It elaborates a critical social theory framework for investigating the functional and extra-functional dimensions of university service within the overarching conceptual framework of a theory of communicative action. Chapter Three presents the methodology for the case study. Chapter Four establishes the historical and situational context for interdisciplinary science in environmental policy and planning. Chapter 5 analyzes data obtained from the case study of interdisciplinary inquiry and conduct within the university sector. It focuses on the micro-level interactions of university research faculty participating in the process of constituting and regulating interdisciplinary science within the university sector. Chapter 6 moves the analysis to the macro-level of interdisciplinary inquiry and conduct to investigate patterns of the practice of public reason in the contexts of the various public spaces that were constituted and regulated within the case that established a focus for the research. Chapter 7 reviews the process followed in the research study, highlights the primary findings of the research, summarizes the conclusions of the dissertation, and draws wider implications.

CHAPTER TWO
CRITICAL REVIEW OF THE LITERATURE AND CONCEPTUAL FRAMEWORK

This chapter reviews selected literature relevant to investigating the rational basis for asserting an ethical position for progressive academic inquiry and conduct in the practice of interdisciplinary science within the university. The review attends to exemplary macro-level theoretical interpretations of reason and rationality that are framing contemporary controversies over the status and meaning of progressive academic practice. The review is organized in terms of a juxtaposition of modern and postmodern interpretations of the grounds for ethical and political practice within post-metaphysical reason; and a juxtaposition of positivist and post-positivist perspectives on the ethical standpoint of scientific practice in a post-metaphysical context. The purpose of the review is to clarify the research focus, specify conceptual categories that establish a meta-conceptual framework for linking theory to practice, and identify literature that informs the development of a critical social theory framework for the empirical research. The review is structured to make the process of establishing a logical linkage between empirical observations and theoretical generalization explicit. It proceeds by identifying debates in the literature that were reviewed in the process of extending findings from the field study to developing an explanatory framework. For the sake of clarity, the conceptual framework is presented in this chapter as an activity that occurred prior to the collection and analysis of empirical observations. These activities,

however, were interrelated. The process of integrating methodology and conceptual formulation is addressed further in Chapter Three.

The next section identifies discursive anomalies in modern and post-modern literatures that address the relation of practice to theory within the intellectual discourse. It focuses on the reflective consideration of reason and rationality in the philosophical discourse of modern society. The following section identifies procedural anomalies in positivist and post-positivist literatures on the relation of theory to practice in academic science. It focuses on competing normative standards for reason and rationality in the value sphere of science in modern society. Following a discussion of how these literatures conceptualize the social political standpoint of academic inquiry and conduct, the elements of a critical social theory framework are presented. The chapter concludes with a conceptual framework that attends to the "double dynamic" of the public character of university reason that limits and conditions interdisciplinary science practice within the university.

2.1. Discursive Anomalies in the New Historicism: Post-modernity, Modernity and Progressive Academic Practice

Endorsements for interdisciplinary science as a new paradigm for academic practice have emerged at a time when the only historical certainty appears to be a lack of certainty about how to interpret, and respond to, the paradoxes that characterize the current historical epoch (Edwards and Usher, 1997). One manifestation of this confusion in the humanities and social sciences is a confrontation between modern and post-modern conceptions of the grounds for progressive academic practice in contexts of uncertainty. At the centre of this debate is a reinvigorated critique of the

"Enlightenment effort to employ reason to build a free and rational society" (Seidman, 1989: 2). Underpinning and overarching the debate is a paradigmatic shift from a philosophy of consciousness or subjectivity, to a philosophy of language (Dallmayr, 1991; McCarthy, 1984). This shift has emerged within the context of a sustained critique of the excesses of a metaphysical unity of reason within the discourse of modernity, and rejuvenated efforts to explore the nature and possibilities of a post-metaphysical unity of reason in the contemporary context (Hohengarten, 1992).

2.1.1. Progressive Academic Practice in a Condition of Post-modernity

Post-modernity is a conceptual category that serves multiple tasks in the contemporary discourse (Ritzer, 1996; Rundell, 1992). Descriptively, it designates new cultural products that have emerged to displace cultural products of the modern era (Jameson, 1984). Historically it refers to a new epoch that follows the modern era (Lemert, 1990; Lyotard, 1984). Normatively and analytically it is a conceptual category that designates a new mode of theorizing in the aftermath of modern reason. Crosscutting these various uses is the claim that the condition of post-modernity is a category that refers to that which is historically new. At the centre of the post-modern discourse is a rejection of Kant's idea of the autonomous rational subject as a source of reason and a corresponding negation of notions of objective and universal reason as fundamentally tied to power. According to McCarthy (1995: viii) "the critique of subject-centred reason" within the post-modern discourse is being advanced as a "prologue to the critique of a bankrupt culture."

Specifying an ethical position for progressive academic practice within a

condition of post-modernity poses a fundamental challenge. In the extreme, the post-modern standpoint rejects the notion of progress as a false ideal that is a source of all that confronts the post-modern individual, and the post-modern society in a period of decay (Baudrillard, 1983 cited in Rosenau, 1992). The radical post-modern standpoint embraces ethical skepticism and non-participatory politics as appropriate responses to the illusion of modern values of truth, justice, and authenticity (Rosenau, 1992). More optimistically, the moderate post-modern standpoint embraces ethical relativism and a politics of radical participation in the public political sphere (Bauman, 1992; 1987). Both radical and moderate post-modern positions justify their ethical standpoints in terms of an anti-foundationalist position on the sources and implications of human reason. This position is grounded in a rejection of the ahistorical notion of an autonomous rational subject as a centre for reason. In the absence of the rational subject, human reason is re-conceptualized as a socio-cultural product that reflects and extends the power relations that condition academic practice in society. Examination of the presuppositions that inform the new historicism of post-modernism establishes a basis for evaluating the ethical position of progressive academic practice in a condition of post-modernity.[1]

Post-modern motivations for displacing the autonomous rational subject as a centre for reflective reason and ethical conduct arise from an identification of the

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The terms "new historicism" and "new scientism" are used in the dissertation in a sense that is comparable to Weber's ideal type construction. They are concepts that are intended to capture and "analytically accentuate" common features of a range of conceptual and empirical literatures that are framing contemporary intellectual discourses.

concept of the modern subject with the negative features of modern society. Specifically, the modern subject is viewed as the embodiment and reflection of the hegemonic beliefs and values of modern society:

> ...the modern subject is a hardworking, personally disciplined, and responsible personality.... S/he plans ahead, is organized, and defers gratification. The modern subject may become committed to political projects and work for goals of an ideological character. S/he may believe in free will and personal autonomy, but s/he will follow majority opinion (or party line) once the vote has been taken and a decision is made.... S/he respects rational rules, the general will, social conventions, fixed standards that seem fair. S/he searches, in good faith, for truth and expects that ultimately such a quest will not be fruitless....the modern subject has confidence in reason, rationality, and science and puts all these ahead of emotion (Rosenau, 1992: 43).

As an embodiment of all that symbolizes modernity, the modern subject is portrayed as a subject that is devoid of autonomous agency, a conduit for the non-reflective reproduction of modern power relations.

Rejection of the modern subject as an invention, rather than an agent of modernity, is used to expose modern forms of secular humanism as ideological legitimations for the unplanned dispersal of power in society (Dreyfus and Rabinow, 1983). Within a post-modern perspective, the humanist discourses of modernity are considered inherently suspect and complicit in the spread of domination (Beck, 1992; Bauman, 1991). Liberal, technical, Enlightenment and Renaissance humanist discourses are portrayed as contradictory and grounded in the false notion of a modern subject. Post-modern critics marshal historical and contemporary evidence of the unintended, negative, and disruptive consequences of humanist interventions to support

their position. As Habermas (1994: 50-51) points out:

> ...we see outlined on the threshold of the twenty-first century the horrifying panorama of a worldwide threat to universal interests: the spiral of the arms race, the uncontrolled spread of nuclear weapons, the structural impoverishment of developing countries, problems of environmental overload, and the nearly catastrophic operations of high technology....

Radical critics of modernity point to these spectacles to justify their rejection of the modern subject and the humanist ideals of modern society.

Rejection, or displacement of the sovereign subject, is used to establish a warrant for rejecting the subject-object dichotomy that grounds notions of authority, objectivity, expertise, and hierarchy in modern society. "Without a subject to announce logo-centric meta-narratives, and without other humans with subject or object status to register recognition and approval, such devices are deprived of any voice" (Rosenau, 1992: 50). Overall, the displacement of the modern subject is used to justify a radical critique of the impurity of reason in terms of "its unavoidable entanglement in history and tradition, society and power, practice and interest" (McCarthy, 1995: viii).

In the shift from a philosophy of consciousness or subjectivity, to a philosophy of language, post-modern perspectives emphasize the performative, contextual and constitutive effects of language. Reality is variously attributed to the constructivist effects of language (Harman, 1988), the contextualist nature of knowledge claims (Fish, 1989), or linguistic convention (Aronowitz, 1988; Latour, 1987). Within a theory of reality that is reduced to the effects of language, the modern subject is redefined as a "position in language", an "effect of discourse" (Flax, 1990 cited in Rosenau, 1992: 43).

The post-modern individual, however, is not to be confused with the language using subject that was the focus of Husserl's phenomenology (Alexander, 1987). Rather, the post-modern individual who asserts a truth or normative validity claim is merely expressing an opinion that reflects her/his position as an effect of power within a hegemonic discourse. As McCarthy (1991) points out, the post-modern individual is viewed as a constitutum of history and society, whereas the phenomenological subject is viewed as a constituens.

Designating truth and normative validity as essentially arbitrary, post-modern perspectives undermine the modern idea of theory and universal morality as a basis for rational social action. Boundaries between truth and ideology, knowledge and power are dissolved because "...power and knowledge directly imply one another; there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations" (Foucault, 1980: 27). Because all knowledge is implicated in power relations, knowledge is viewed as inherently bound up with its social and historical contexts of creation and application.

Given the assumption of an ontological interrelation of knowledge and power, notions of inter-textuality (Latour, 1987) and teleology (Rosenau, 1992) are introduced to replace modern concepts of causality and predictability. The epistemological standpoints of idealism, materialism, and positivism are summarily dismissed because they imply the possibility of true knowledge, causal explanation, and predictability. Modern social theory and methodology are displaced by practice, and practice is reduced to the constitutive, contextualist, and performative effects of language in the

absence of an autonomous subject. According to Schubert (1995: 1004), "norms and values, if they exist at all, are emergent and reified phenomena that have no grounding outside of the practical activities of functioning subjects." The "word" of the academic, the professional, and the expert is considered legitimate only within the discourse that it originates from, and in which it is sustained. In this context, the progressive post-modern theorist is delegated the empirical and historical task of de-constructing and interpreting the codes that constitute his or her practice within the hegemonic discourse. Among those who have taken up this task in the social science discourse, Foucault's genealogical project stands out as exemplary.

The problematic of power and knowledge is the primary theme of Foucault's genealogical project (Gordon, 1990). In this project, Foucault undertakes an examination of how we govern ourselves and others through the production of regimes of truth in historical contexts (McCarthy, 1991). Taking up this problem, Foucault asserts that "Truth is a thing of this world: it is produced only by virtue of multiple forms of constraint. And it induces regular effects of power" (Foucault, 1980: 131). Foucault's analytical focus is oriented to:

> ...the rules, prescriptions, procedures and the like that are constitutive of rational practices, to the relations of asymmetry, non-reciprocity, and hierarchy they encode, and to the ways in which they include and exclude, make central and marginal, assimilate and differentiate (McCarthy, 1991: 50).

Substantively, Foucault's focus is the historical development of the social sciences and the role that social scientific expertise has played in the reproduction and extension of relations of domination in modern society (Dreyfus and Rabinow, 1983). One of the

explicit tasks of the genealogical project is to expose the idea of the universal intellectual as "the final arbiter in issues of universal justice, reason and truth" as historically obsolete (Schubert, 1995: 1004). What remains is a notion of the specific intellectual whose political and ethical goal is to "[detach] the power of truth from the forms of hegemony, social, economic and cultural, within which it operates at the present time" (Foucault, 1977: 133). Foucault's genealogical project has been criticized for advancing two reductionist conceptions of the social historical basis for progressive academic inquiry and conduct in contemporary society (McCarthy, 1991; Cohen and Arato, 1992; Fraser, 1989; Taylor, 1985; 1986).

In Foucault's early formulations of the genealogical project, the dismissal of the rational subject is accomplished through an ontologizing of social power. In this phase of the project, his theory of knowledge assumes the form of a theory of the power of social forces that are detached from the will of individuals. Power is conceptualized as a network of social relations that encompass, permeate, and normalize the social body. "Just and unjust social arrangements, legitimate and illegitimate uses of political power, strategic and cooperative interpersonal relations, coercive and consensual measures" are portrayed as coextensive with power and society (McCarthy, 1991: 57). The social agent is reduced to the value neutral condition, vehicle, and effect of systems of functionalist reason, and social relations are reduced to power relations that take the form of technologies of the self. Progressive academic inquiry and conduct in these early formulations are understood to operate as a strategic transgression of the normalizing effect of systems of power.

In Foucault's later formulations of the genealogical project, the problem of

autonomous ethical conduct is resolved at the level of the individual. This is accomplished by reintroducing the post-modern individual as a centre for perpetual self-reflexivity. The re-emergence of the post-modern individual is presented in the form of an ethic of care of the self and "'care of the self,' is now said to be a sine qua non of properly caring for others, that is, of the art of governing" (Ibid: 68). By emphasizing self- individualization within multiple and contingent contexts, Foucault reduces the critique of existing social arrangements to a politics of identity. Given this reduction, it is not clear how a concept of ethical conduct in the form of self- individualization would allow individuals to escape from self-proclaimed dogma (Pels, 1995). In both phases of the genealogical project, Foucault adheres to a historicist conception of human reason that precludes the possibility of entering into, and producing a rational discourse that has the capacity to identify generalizable interests as a means to govern both self and community. Habermas attributes the two reductionist tendencies in Foucault's genealogical project to a failure to take the philosophy of language seriously as a new paradigm for progressive academic inquiry and conduct in modern society. To the extent that the genealogical project remains tied to the paradigm of a philosophy of the subject, Foucault forfeits the possibility of acknowledging the constitution of an intersubjective world through which the facticity of the objective and subjective worlds is made available. By presupposing, or dismissing the facticity and normative potentials of intersubjective social worlds, Foucault denies any potential for transcending the contingencies of subjective reason in the historical situation and thereby realizing the positive potentials of objective knowledge as an ongoing ideal in the practice of intersubjective reason.

2.1.2. Progressive Academic Practice in a Condition of Modernity

The critique of reason and rationality is not unique to the post-modern discourse. In modern philosophical discourses, the critique of reason is the medium for the advancement of philosophical knowledge (Habermas, 1992). In the philosophical discourse of modernity, the critique of reason and rationality has provided a medium for the emergence of competing conceptions of the foundations and tasks of social theory and social science in modern society. One source of disjuncture is the division within philosophy between Cartesian analytical rationalism and Humean rational empiricism. The philosophical-historical discourse of modern social theory is linked to neo-Kantian and neo-Hegelian traditions of analytical rationalism. The positivist discourse of modern social science is linked to the Humean tradition of rational empiricism. The former is the focus of discussion in this section. The positivist discourse of modern social science is discussed in a subsequent section.

Kant's critical reflections on the "Cartesian paradigm of the solitary thinker" established the philosophical point of departure for the development of modern social theory (McCarthy, 1984: ix; Horster, 1992). Within the Kantian critique of the Cartesian paradigm of the philosophy of consciousness:

> ...different domains of the world are interpreted with different rules, each of which is assigned to a particular instance of reason. The objective domain is interpreted with the rules of theoretical reason that are founded in the *Critique of Pure Reason*; the social domain with the rules of practical reason (*Critique of Practical Reason*), and the subjective domain with the rules of aesthetic-expressive reason that are laid out in *Critique of Judgement* (Horster, 1992: 46).

Kant's identification of the different domains of cognitive reason and their associated logics extended Descartes' principle of subjectivity into a formal structure of abstract human consciousness. The Kantian formulation of the different dimensions of autonomous reason, however, retains the Cartesian notion of the monological cognitive capacity of the rational human subject. This rational subject is understood to exist external to a world of objects which he/she seeks to represent in thought, and through representation, to control. Because reason is mediated by the subjectivity of the individual, it is considered to be fallible and subject to distortion. For Kant, the unity and perfectability of human reason were to be realized through ongoing processes of critical self-reflection abstracted from the historical condition of the human subject.

Hegel's dialectical philosophy of historical reason, in the form of Absolute Knowledge or *Geist*, is identified by Habermas (1995) as an initial attempt to displace the ahistorical, and subject-centred reason of the Cartesian paradigm. Hegel challenged the Kantian philosophy of the subject with the proposition that:

> ...no individual is independent of or separate from others since each is connected in ways which define their being and consciousness in relation to the social world, to others, and to the system of beliefs and values which are already in existence (Morrison, 1995: 23).

Hegel's historical and relational understanding of reality established the basis for a dialectical conception of human reason and historical development. The logic of the Hegelian dialectic is based on three interrelated principles that co-exist in a process of ongoing contradiction. Within his theory of development these principles and their interrelations are elaborated as follows:

> ...affirmation [thesis] is the capacity of an existing thing to affirm itself and to be in the world, actively, rather than passively...negation [antithesis] refers to the principle in the world which acts to limit or resist development... [and] the concept of 'negation of the negation' or synthesis...is the capacity of the negation to be reconstituted or fundamentally altered in its nature (Ibid: 111-12).

Within the Hegelian model of human reason, the subject's capacity for abstract thought lifts the individual out of history and enables a process of critical self-actualization. According to Habermas (1995), the philosophical discourse of modernity has been framed within these two competing conceptions of the source and development of autonomous reason in society; Kant's notion of abstract self-reflection that transcends the normative force of history, and Hegel's notion of abstract self-actualization that is the immanent realization of the normative force of history. Within the context of this philosophical discourse, modern social theory took its departure.

At the interface of philosophy and modern social science, the classical social theorists explicitly linked their investigations into the problem of societal modernization to the concept of rationalization. The approaches of Marx and Weber to the problem of societal modernization as a problem of rationalization have been particularly influential in the development of contemporary critiques of the implications of modern reason for progressive rational conduct in modern society. Whereas Marx's approach emphasized the positive potentials of modern reason for the realization of progressive social conduct, Weber's approach was decidedly pessimistic. The point of departure for Weber's neo-Kantian theory of modern society was the disenchantment of reason, and its differentiation into the value spheres of science, morality, and aesthetics. As

previously noted, Weber elaborated his theory of societal development in the form of a process of rationalization. To investigate the implications of Weber's social theory for contemporary conceptions of progressive academic practice, it is important to distinguish between his understanding of the concepts of rationality and rationalization.

Rationality is a concept that Weber used to refer to the standards and normative criteria that inform and guide social action within particular social contexts. For Weber, social action is rational:

> ...in so far as (a) it is oriented to a clearly formulated unambiguous goal, or to a set of values which are clearly formulated and logically consistent; [and] (b) the means chosen are, according to the best available knowledge, adapted to the realization of the goal (Parsons, 1947: 16).

In his theory of social action, Weber distinguished four types of social action that establish a basis for social action in modern society. Two of these are considered to be non-rational types of social action; and two are considered to conform to the criteria of rational social action. Traditional and affective social actions are the two types of social action that constitute the former category. Traditional social actions are guided by habit or convention. Affective social actions are guided by feelings and strong emotions. These types of social action are considered non-rational because they are reactive, and do not involve a conscious or deliberate reflection on the goals and means of social action.

Value rational action and instrumental rational action are the two types of social action that Weber identified as exhibiting a rational orientation. In value rational action, social actors are motivated by duty and moral obligation. The aim of value rational action is the realization of a value. Instrumental rational action is social action

that is goal oriented, and that takes into account the most effective and efficient means to achieve that goal. The aim of instrumental rational action is success. Weber "described as rational the process of disenchantment which led in Europe to a disintegration of religious world views that issued in a secular culture" (Habermas, 1995: 1). Specifically, Weber used the concept of rational to refer to the principles and logics of learning processes that characterized the value and instrumental rational action spheres of modern society.

Rationalization was the concept that Weber used to "describe the process by which nature, society, and individual action are increasingly mastered by an orientation to planning, technical procedure, and rational action" (Morrison, 1995: 218). Weber conceived of rationalization as the process by which instrumental rational action emerges to dominance within the rational social action spheres of modernity. In developing his theory of modern society, Weber advanced the thesis that the process of societal modernization in Western society was most appropriately understood as a process of rationalization. With his theoretical framework, "Weber depicted...not only the secularization of Western *culture* but also and especially the development of modern *societies* from the viewpoint of rationalization" (Habermas, 1995: 1; emphasis in original). From his empirical investigations into the development of modern society he concluded that:

> The new structures of society were marked by the differentiation of two functionally intermeshing systems that had taken shape around the organizational cores of the capitalist enterprise and the bureaucratic state apparatus. Weber understood this process as the institutionalization of purposive-rational economic and administrative action (Ibid: 1-2).

Although Weber expressed relative ambivalence about the social implications of rational learning processes within the value spheres of society, his observation of the extension of processes of rationalization into all spheres of social life led him to the pessimistic conclusion that modern society was destined to become an "iron cage" characterized by the loss of freedom and meaning. According to Weber, this tendency was particularly evident in the instrumental effects of bureaucratic processes of rationalization. Weber regarded the dominance of bureaucratic organization in modern society as inherently incompatible with the value rational processes of democratization. He attributed this incompatibility to the tendency for bureaucratic institutions to become closed and to systematically exclude the public from participating in processes of decision making and governance. Weber's pessimistic assessment of the process of rationalization in society was in stark contrast to the positive assessment of rationalization that Marx had advanced in his critical social theory of societal modernization.

Working out the framework of a critical social theory of societal modernization, Marx conceived of the modernizing processes of secularization, democratization, individuation, and scientific-technological development as embodying an emancipatory potential (Seidman, 1989: 3). Like Hegel, Marx adhered to the notion that "the potentialities of men [sic] and things are not exhausted in the given forms and relations in which they may actually appear" (Marcuse, 1964: 113). Opposing Hegel's idealist conception of the relationship of social existence to social consciousness, Marx posited that false consciousness in society originates in the conditions of social existence:

> My dialectical method is, in its foundations, not only different from the Hegelian, but exactly opposite to it. For Hegel, the process of thinking, which he even transforms into an independent subject, under the name of 'the Idea', is the creator of the real world, and the real world is only the external appearance of the idea. With me the reverse is true: the ideal is nothing but the material world reflected in the mind of man, and translated into forms of thought (Marx, 1976 [1873]: 102).

Although Marx subscribed to a materialist conception of the development of human consciousness, he did not conceive of the human subject as a passive victim of social and natural forces. Rather, Marx advanced the claim that "Man [sic] creates the world in the sense that he produces his tools and external objects with the materials of nature, thus modifying nature, his means of acting upon it, and his relations with fellow men" (Zeitlin, 1981: 100). Implicit in this claim is a conception of the rationalization of the institutional framework of society as an effect of the development and expansion of scientific and technological knowledge as a productive force in society.

In his critique of political economy, Marx attributed the failure to realize the emancipatory potentials of scientific and technological reason to the dominance of capitalist social relations of production. By locating the source of societal domination in the appropriation and exploitation of human labour, Marx initiated a tradition of critical social theory that was aligned with the interests of the subordinated class as a social agent with the capacity to realize a non-reified process of societal rationalization. Marx's emphasis on the forces of production as the driving force of history was accompanied by a tendency to portray cultural phenomena as the ideological effects of the social relations of production that dominate within the economic base of society (Urry, 1981). Given the

failure to incorporate culture as a categorical framework in political economy, Marx's formulation of critical social theory as a critique of the capitalist mode of production left a somewhat ambivalent heritage. On the one hand, orthodox Marxists developed the critique of political economy within a positivist paradigm that eclipsed Marx's initial insights into the immanent relation of philosophical reason and social emancipation. The result was to transform Marxist analysis into a form of scientism. On the other, Hegelian Marxists used the positivist and technocratic reformulation of Marx's critical theory as a basis from which to launch a radical critique of culture and expose the negative implications of cultural rationalization for societal modernization.

In the intellectual products of the early critical theorists of the Frankfurt School, this latter tendency was expressed in the form of a radical critique of modern culture that extended the more pessimistic insights of Weber's theory of modern society (Honneth, 1991). In the *Dialectic of Enlightenment* and the *Eclipse of Reason*, Horkheimer reconstructed Weber's social-theoretical critique of rationalization in the form of a totalizing philosophical historical critique of rational learning processes (Honneth, 1991). Within a truncated Hegelian dialectic, critique was reformulated as a one dimensional negation of the affirmative potential of Enlightenment reason. The problems that this incurred for critical social theory are exemplified in Marcuse's critique of science and technology as both a productive force and ideological effect in modern society.

In *One Dimensional Man*, Marcuse (1964) posits that what Weber had identified as the rationalization of society was in fact the political domination of nature and society by the instrumental techniques of science and technology. According to

Marcuse (Ibid.: 158), the extension and development of science and technology in society is a historical project:

> The principles of modern science were *a priori* structured in such a way that they could serve as conceptual instruments for a universe of self-propelling productive control; theoretical operationalism came to correspond to practical operationalism...domination perpetuates and extends itself not only through technology but as technology, and the latter provides the great legitimation of the expanding political power which absorbs all spheres of culture.

Marcuse's solution to the problem was to call for an altered attitude to nature. "Instead of treating nature as an object of possible technical control, we can encounter her as an opposing partner in a possible interaction" (Habermas, 1971: 88). Advancing this claim, Marcuse (1964) foreshadowed elements of Foucault's (1970) genealogical project. Marcuse, however, does not ground his argument in the radical dismissal of the rational subject. Rather his critique moves in the direction of a critique of the rise to dominance of technical reason as the source of problems in modern society. In *One Dimensional Man*, Marcuse stops short of extending his analysis to an account of why technical reason has emerged to dominance. It is this theoretical failure in Marcuse's critique of modern science and technology, and the critique of instrumental reason within the Frankfurt School more generally, that Habermas identifies as problematic. Habermas' (1971: 89) reformulation of the problem addressed by Marcuse provides an early indication of the direction of his conception of interdisciplinary science and progressive academic conduct in the form of critical social theory:

> What is singular about the 'rationality' of science and technology is that it characterizes the growing potential for self-surpassing

> productive forces which continually threaten the institutional framework *and at the same time*, set the standard for legitimation for the production relations that restrict this potential. The dichotomy of this rationality cannot be adequately represented either by historicizing the concept or by returning to the orthodox view: neither the model of the original sin of scientific-technical progress nor that of its innocence do it justice [*emphasis in original*].

With this assertion, Habermas positions his project of interdisciplinary social science in the form of critical social theory as an alternative to both historicism and scientism.

2.1.2. Progressive Academic Practice in a Condition of Enlightened Modernity

Habermas views the radical critique of reason and rationality, in both modern and postmodern forms, as regressive and fundamentally flawed (Habermas, 1981; 1995). These regressive tendencies, according to Habermas, are evident in the failure to acknowledge and provide a balanced assessment of the factual and normative conditions of modern society. He identifies an explicit tendency among radical critics to overlook the positive achievements of modernity such as "its institutionalization of the rule of law, formal democratic principles, civil, political and social rights, [and] cultural pluralism" (Seidman, 1989: 6). The source of these theoretical failures, according to Habermas, arise from the more fundamental failure to theorize adequately the social sources, processes and consequences of value conflicts in modern society. Habermas attributes the latter problem to a common failure in the perspectives of postmodern and modern critical social theory to sever their ties to a philosophy of the subject.

Although Habermas is explicitly critical of those frameworks that seek the radical negation of modern reason, he does not dismiss the significance of the problems

that have been identified by the proponents of these perspectives. In several respects, the difference between Habermas and those he critiques is one of degree, rather than kind. McCarthy (1991) has identified several continuities between Habermas and Foucault in their approaches to the critique of reason. These include a common interest in "shifting the level of analysis [from theory] to practice", "transcending the subject-centeredness of modern Western thought", recognizing "the primacy of practical reason...and [the] unavoidable reflexivity of social inquiry" and acknowledging the value of critique as a means to expose the ideological effects of "apparently rational practices" (Ibid: 49).

There are, however, significant differences between the two. In particular, Foucault and Habermas part company in the overall goal that they affix to their respective projects. Whereas "Foucault does not regard genealogy as being in the service of reason, truth, freedom and justice," Habermas seeks to critique the rationality of existing social relationships in order to "replace them with social arrangements that are rational in other than an instrumentalist sense" (Ibid: 50). This latter task also distinguishes Habermas' critical social theory from the pessimism that increasingly characterized the project of critical social theory in its earlier versions within modern social theory. Overall, Habermas seeks to realize the synthetic phase of the Hegelian dialiectic "through the *determinate* negation of subject-centered reason by reason understood as *communicative* action" (McCarthy, 1995: vii). For Habermas, the problem of critical social theory and the failure of postmodern alternatives arise from a misunderstanding of the fundamentally social rational basis of human reason and

progressive social conduct in society. Habermas views this as a problem that originated with Kant and Hegel. Further, it is a problem that continues to frame the philosophical discourse of modernity to the extent that the facticity and normativity of the intersubjective world is presupposed, rather than acknowledged and analyzed.

2.2. Procedural Anomalies in the New Scientism: Positivism, Post-positivism and Progressive Academic Practice

The shift from a philosophy of the subject to a philosophy of language in the philosophical discourse has coincided with a shift from the hegemony of a positivist philosophy of science to "modes of [post-positivism] more hospitable to different dimensions of reasoning and argumentation" (Dallmayr, 1991: 1). In this debate attention is turned to the procedural anomalies that characterize relations between natural and social science within the value sphere of science. Confrontations between positivist and post-positivist conceptions of science have thematized three principles that guide scientific inquiry within a positivist philosophy of science. These principles concern: (1) the methodological unity of the natural and social sciences; (2) the value-neutrality or objectivity of scientific procedures; and (3) the adoption of scientific rationality as a normative model for rational knowledge in society. The thematization of these principles in the contemporary discourse points to a convergence between the discourses of positivism and the philosophical discourses of modernity.

2.2.1. Positivism as Progressive Academic Practice

Positivism, like post-modernity, is a conceptual category that conveys different meanings in the intellectual discourse. In the mid-nineteenth century, Auguste Comte introduced the term to designate a new scientific philosophic doctrine for the social

sciences. The new doctrine was to establish a framework for severing the ties of social thought from the distorting influences of idealism and speculative reason (Morrison, 1995). In the 1920s and 1930s, the doctrines of positivism were revitalized in the form of logical empiricism and advanced as a means to "block the simple and crude imposition of political ideas into scientific practice" (Lance and May, 1995: 977). In the contemporary discourse, the concept of positivism has been appropriated as a generalized category of abuse; a category that symbolizes the negative implications of a form of scientific inquiry that no longer practices self-reflection (Ibid.). Lance and May (Ibid) suggest that the contemporary critique of positivist science is motivated by an attempt to "emphasize and clarify the relevance of political commitment to the practice of science". Throughout its history, the concept of positivism has been tied to a practical interest in realizing the meaning and value of scientific inquiry for society. A review of the rise of positivism that elaborates its strengths and isolates its excesses is an important prelude to investigating the social rational basis for a post-positivist conception of progressive academic practice in the contemporary context.

Comte's positive philosophy of social science is located within the Humean philosophy of rational empiricism. Within the Humean tradition, all human cognition is presumed to originate in human experience (Feinberg, 1971). Adopting this position, Comte broke with the speculative tradition of Cartesian rationalism and the abstract formalism of Kantian reason. His motivation for developing a positive philosophy of social science, however, was related to his perception of the social anarchy implied in Hegel's dialectical logic of human and historical development (Morrison, 1995). Opposing the Hegelian dialectic, Comte advanced a linear conception of human history

as progressing through three pre-determined stages of human cognitive capacity. Comte identified these stages as the theological, metaphysical and positivist. Within Comtean positivism, cognitive and social development were equated with the emergence and extension of the positivist scientific method as a paradigmatic model for all forms of knowledge that aspired to the status of rational knowledge. According to Morrison (1995), the failure to ascribe to the positivist scientific method that grounded the objectivity and success of mathematics, physics, and biology was interpreted as a failure to develop as a form of rational knowledge.

As a normative framework for the social sciences, Comtean positivism:

> ...advocated that the search for ultimate or abstract truths be abandoned in favour of a search for law-like regularities...that all statements about the world should be based on observation and that observation alone be the basis of a theory of knowledge ...[ultimately] the search for facts...and relationships among facts would lead to the discovery of general laws (Ibid: 123).

Histories of the development of sociological theory and research throughout the nineteenth and twentieth centuries attest to the widespread influence of positive doctrines on academic practice in the social sciences (Giddens and Turner, 1987; Friedmann, 1987; Bauman, 1978; Giddens, 1977; Gouldner, 1970). These histories also attest to the importance that was attached to positivism as a means to secure intellectual and social respectability for the development of sociology as normal science. Ironically, this value appears to have been as appealing to those who followed the Marxian tradition and claimed an affinity to the Hegelian dialectic as it was to those who followed the Durkheimian tradition and claimed a more direct lineage to Comtean

positivism:

> ...in so far as there were strongly positivistic strains in Marx's writings, ...Marx can be categorized along with Comte as previsaging, and seeking to bring into being, a science of society which would reproduce, in the study of human social life, the same kind of sensational illumination and explanatory power already yielded up by the sciences of nature (Giddens, 1977: 12-13).

The positive value that was attached to the development of social science as positivist social science is also evident in those domains of sociology that took the social and existential aspects of knowledge and science as a focus of substantive inquiry.

In *Ideology and Utopia,* Mannheim (1936) set an agenda for the sociology of knowledge that was explicitly oriented to an investigation of the social and communal character of all knowledge. In setting this agenda, Mannheim proposed two goals for the sociology of knowledge. Theoretically, its task was to analyze the relationship between knowledge and existence. Empirically its task was to investigate the historical forms of this relationship in the development of social existence. Mannheim distinguished his approach from philosophical relativism by designating the standpoint of the sociology of knowledge as relational. Mannheim characterized relativism as "denying the validity of any standards as well as the existence of order in the world" (Phillips, 1974: 67). In contrast, Mannheim's relational standpoint advanced the view that criteria for distinguishing right from wrong and true from false is to be determined within its situational context. Mannheim's warrant for a relational standpoint, however, reveals a lingering positivism. As noted by Phillips (1974), Mannheim viewed the natural sciences as immune to the socio-historical perspective and a potential model for

the pursuit of knowledge by the "socially unattached intelligentsia". Given his overall thesis of the social connectedness of knowledge, it is not clear how this notion is to be warranted, other than to ascribe to an implicit assumption that facts are external to the individual and that subjective knowledge of these facts can be used to assess the validity of particular knowledge claims.

In the Mertonian tradition of the sociology of science, the affinity to positivist doctrine is more explicit. Gutting (1980), King (1980) and Whitley (1972) point out that in establishing an agenda for the sociology of science, Merton dismissed epistemological questions as falling outside of the domain of sociological inquiry. The positivist turn in Merton's sociology of science is interesting, given his early assertion that the discoveries of the individual scientist are:

> imbued with significance through contact with other scientists [and that] long after the theory has been found acceptable by the individual scientist on the basis of his *private* experience he must continue to devise a proof or demonstration in terms of the approved canons of scientific verification present in his culture (Merton, 1970: 220 [emphasis in the original]).

These early encroachments into the domain of epistemological questions were subsequently eclipsed by the turn to an empirical emphasis on the social organization of science, the investigation of social influences on the processes of discovery, the behaviours of individual scientists, and the social images of science in society (Barber and Hirsch, 1962). By avoiding questions concerning the social basis for establishing the validity of the rational authority of science as a communal practice, the Mertonian tradition adopted a positivist conception of the scientific ethos, and focused on

developing a sociological investigation of the individual and organizational behaviours of scientists (Merton, 1942; Parsons, 1947; Barnes, 1972).

The ascendancy and dominance of positivism in functionalist social science did not preclude the influence of alternative theories of knowledge and science on the development of social science methodologies. In the historical and hermeneutic versions of traditional social science, these alternative conceptions of knowledge and social theory established the basis for the development of alternative methods of inquiry. Giddens (1977: 21) has identified three approaches within traditional social theory that are tied to a common interest in the centrality of "*verstehen* [meaning] in the study of human conduct," and to an interest in replacing the methodological monism of empirical social science with the methodological dualism of an interpretive social science. These approaches include Weber's contributions to the *Methodenstreit* debate, Wittgenstein and Austin's philosophies of language, and the phenomenological philosophy of Husserl (Ibid). Weber's contribution to the methodological controversy was explicitly oriented to an investigation of the problem of methodological dualism through his elaboration of the concept of *verstehen* .

Weber's contributions to the *Methodenstreit* were centered on five interrelated issues. As itemized by Morrison (1995: 267), Weber's objectives were to: "(1) demonstrate that a search for law-like regularities was not possible in the social sciences; (2) show that the phenomena studied by the social sciences have definite properties which mark them off from other disciplines; (3) demonstrate that the subject matter of the social sciences was made up of individuals whose social action was based on values; (4) demonstrate that in all the disciplines, including the natural sciences, the

facts never speak for themselves; and (5) show that the social sciences must arrive at a methodology which encompasses both general and individual aspects of historical reality." Weber's efforts to establish the centrality of values in social action and in historical and social science analysis are explicitly relevant to the objectives that have been identified for this research.

In an early contribution to the *Methodenstreit*, Windelband (1894) set out to sever the ties of the concept of method in the social sciences from the domain of natural science (Morrison, 1995). Taking Kant's silence on the method of historical and ethical knowledge as a point of departure, Windelband argued that the natural and social sciences are two forms of knowledge that describe two different levels of reality:

> In the first of these, there is knowledge of facts and of the observable world in which causes and laws can be found in concrete reality. This level of reality is the realm of the natural sciences. In the second...there is knowledge of values and ethics, and this implies knowledge of an ethical realm consisting of the products of human culture— including the pursuits of actors and the judgements which they make in relation to the social world in which they live and act. This level of reality is the domain of the historical and social sciences (Morrison, 1995: 258).

Given their orientation to a relatively ahistorical nature, the natural sciences were portrayed by Windelband as exhibiting a value orientation to the construction of general laws and the investigation of exemplars of those laws. The method of the natural sciences was depicted as nomothetic. The historical sciences, according to Windelband, exhibit a value orientation to particular events as a means to construct general patterns. The method of the social sciences was depicted as ideographic. Implicit in Windleband's argument was the claim that human values and judgements necessarily

precede and mediate knowledge about both the natural and social worlds. For Windleband, the source of the value orientation was the objective value of the pursuit of theoretical knowledge which was not directly linked to the implications of such knowledge for human interest.

In a second contribution to the *Methodenstreit*, Rickert introduced the principle of value relevance. According to Rickert, the principle of value relevance is important in both natural and social science because it is a means by which scientists select and reduce multiple facts about the empirical world into conceptual categories that render the facts comprehensible. Morrison (1995: 347) argues that Rickert's principle of value relevance established a basis for challenging the "claim that the natural sciences select what is of research interest solely on the basis of its objective scientific merit". In opposition to this claim, Rickert argued that the "objects of empirical reality must be of interest to us only because they are 'value relevant', not because they have intrinsic scientific merit" (Ibid.). Advancing this claim, Rickert implied that human interest in both the natural and social sciences plays a constitutive role in producing the knowledge that is subsequently advanced as objective knowledge of an external reality. It was Rickert's views on the principle of value relevance that established a point of departure for Weber's development of the notion of the ideal type.

Drawing upon earlier contributions to the *Methodenstreit*, Weber took up the problem of establishing a basis for asserting general validity claims within the social sciences. Addressing this problem, Weber argued that a distinction be drawn between two types of understanding and two categories of scientific fact. Direct understanding, according to Weber, is oriented to the external or objective world and to facts that can

be observed in the form of physical properties or characteristics. Explanatory, or interpretive, understanding Weber argued, is oriented to the inner or subjective world of social actors. The facts of the subjective world were described by Weber as the meanings and motives that social actors attach to acts or behaviours that are observed in the external world. According to Weber, the investigation of interpretive understanding is unique in that it accomplishes:

> ...something which is never attainable in the natural sciences, namely the subjective understanding of the action of the component individuals. The natural sciences on the other hand cannot do this, being limited to the formulation of causal uniformity in objects and events and the explanation of individual facts by applying them. The additional achievement of explanation by interpretive understanding, as distinguished from external observation, is of course attained only at a price— the more hypothetical and fragmentary character of results. Nevertheless, subjective understanding is the specific characteristic of sociological knowledge (Weber, 1947: 15).

For Weber, the validity claims of the social sciences are considered to have general explanatory power because they can be confirmed through the subjective capacity of the social scientist to abstract from empirical experience and understand subjective social facts in the form of ideal types that are causally related to their context of historical determination. Weber used these basic methodological propositions to formulate his general theory of social action and establish a basis for distinguishing between the rationality of different forms of social action.

Although Weber's concept of *verstehen* has been influential in the development of methodological strategies that distinguish the social sciences from the natural sciences, it is not clear that his use of the ideal type and his development of a general

theory of social action have resolved the issue of methodological monism in the social sciences. Similarly, the related issues concerning the value neutral status of scientific generalization and the assumption that rational knowledge is coextensive with scientific knowledge are not satisfactorily resolved . In fact, there appears to be a lingering monism in Weber's arguments in his tendency to presuppose a fundamental unity of human subjective experience. Further, his arguments convey an elitist standpoint in portraying the social scientist as having privileged cognitive insight in the practice of interpretive understanding. A form of cognitive insight that allows the social scientist to transcend empirical contingencies and gain a degree of objective understanding that is superior to the untrained capacities of the general human subject. Although Weber's methodological insights have moved the social sciences away from temptations to reduce the investigation of human understanding and motivation to positivist observations of human behaviour, his concept of *verstehen* retains a tendency to reduce that understanding to the subjectivity of the individual. As such, Weber's concept of *veresthen* does not allow for an explicit inquiry into the intersubjective availability of the facticity and normativity of objective and subjective worlds.

2.2.2. Post-positivism as Progressive Academic Practice

In the contemporary period, post-positivist challenges to the hegemony of positivist science have emerged from within the natural sciences and from historical and sociological investigations into the progress and practice of science in society (Fischer, 1998). In the natural sciences, developments in the domain of physics are posing a significant challenge to the conventional notion of a fixed and stable physical world that is objectively distinct from the world of human subjectivity (Galison, 1997). Since

Kuhn's (1970 [1962]) historicist challenge to the dominance of rational empiricism in *The Structure of Scientific Revolutions*, the critique of the claim of positivist epistemology to provide objective knowledge with universal validity has become a popular pastime in the historical and sociological studies of scientific practices. In historical studies of the development of science, linkages have been drawn between the rise of a positivist science of certainty and the decline of religious certainty that accompanied the secularization of society (Fischer, 1998). From sociological investigations into science practice, linkages have been drawn between the theoretical standpoints of science and the socio-cultural context in which they are embedded (Rouse, 1987). Far from being considered an objective, rational and value-neutral gateway to true knowledge about an objectively existing reality, these studies repeatedly portray the process of positivist scientific inquiry as a process that is grounded in practical value judgments that shape both the instruments of scientific inquiry and its claim to objectivity (Latour and Woolgar, 1979; Knorr-Cetina and Mulkay, 1983; Collins, 1985; Rouse, 1987).

One of the consequences of critiques of science practice as fundamentally grounded in human values has been a tendency to dismiss the objective and universal rational authority of scientific knowledge because it is imbued with human values and human judgment. Embedded in these arguments is the insinuation that human values and practical judgments are inherently relative and irrational. Given this observation, several of the contemporary post-positivist approaches appear to subscribe to presuppositions similar to those that were highlighted and criticized in the previous discussion of perspectives within the new historicism and the new scientism.

Specifically, these versions of post-positivism appear to ascribe to the assumption that there is one, and only one form of objective, universal rational knowledge; or that there is no rational basis for realizing objective and universal knowledge at all. To the extent that the historical and sociological investigations of science practice adopt the latter position, the post-positivist position exhibits a tendency to converge with the historicist critique of human reason that is characteristic of the post-modern standpoint. One of the primary reactions to the convergence of post-modernism and post-positivism has been a rejuvenated interest in advocating for a reinvented scientism (Gross and Levitt, 1994). In the contemporary debate, Habermas is notable for having taken steps to avoid these interrelated problems by grounding his views on post-positivist science within the framework of a comprehensive concept of rationality in modern society.

2.3. Theoretical Framework

At the meta-conceptual level, debate over the rational basis for asserting an ethical position for progressive academic practice appears to have reached an impasse between proponents of a reinvented historicism and proponents of a reinvented scienticism. In *Modernity versus Postmodernity*, Habermas (1981) has classified the primary positions in this debate as variations on a common theme of revitalized conservativism :

> The *Young Conservatives* recapitulate the basic experience of aesthetic modernity. They claim as their own the revelations of a decentered subjectivity, emancipated from the imperatives of work and usefulness, and with this experience they step outside the modern world. On the basis of modernistic attitudes, they justify an irreconcilable anti-modernism....The *Old Conservatives* do not allow themselves to be contaminated by cultural modernism. They observe the decline of substantive reason, the differentiation of science, morality and art, the modern world view and its merely

> procedural rationality, with sadness and recommend a withdrawal to a position *anterior* to modernity....the *Neo-conservatives* welcome the development of modern science, as long as this only goes beyond its sphere to carry forward technical progress, capitalist growth and rational administration [emphasis in the original].

Habermas' critical social theoretical project is motivated by an interest to avoid the negative potentials implied in these different versions of revitalized conservativism. It is also motivated by an enduring interest in defending the scientific, moral, and political potentials of modern reason in a societal context that is increasingly threatened and eroded by the "imperatives of an almost autonomous economic system and its administrative complements" (Habermas, 1981: 13). Overall, Habermas' project is notable for its sustained commitment to an enlightened critique of th project of modernity (McCarthy, 1984). In this project, Habermas has "sought to defend the notio that only in a society in which a general notion of reason can be invoked can we hope to sustain a good society" (Seidman, 1989: 1).

Habermas' commitment to a reconstituted concept of rationality as the practice of public reason within the philosophical discourse of modernity and to the adoption of the principles of applied critical social theory in society is demonstrated through his practice of a communicative ethic. Habermas practices a communicative ethic to facilitate an interdisciplinary diagnosis of the negative potentials of modern society and to establish a normative basis from which to realize the positive potentials of an enlightened modernity. Ironically, Habermas' commitment to the practice of a communicative ethic has posed a challenge to those who seek to use the theory of communicative action as a meta-conceptual framework for the development of critical social theory. This challenge arises from the dialogical form of his texts and from the

scope and breadth of the project. This section addresses this general problem by providing an overview of the elements of Habermas' project that have been drawn on to develop a conceptual framework for this study. In the following section, the particular themes, categories, and concepts that have been selected to provide a conceptual framework for this study are elaborated in greater detail.

2.3.1. Habermas' Practice of a Communicative Ethic

Over the course of his career, Habermas has sought to advance the project of critical social theory at the epistemological, social theoretical, empirical and political levels of the discourses of modernity (Wolin, 1994). An early statement of Habermas' epistemological position was set out in *Knowledge and Human Interests* (1971 [1965]). In that work, Habermas engaged in a reconstructed dialogue with Husserl's phenomenological critique of the self-understanding of the modern sciences. Like Husserl in *The Crisis of the European Science and Transcendental Phenomenology*, Habermas' goal was to transcend the model of positivist science that had become dominant in the modern era. The basic premises of his critical social theoretical project were set out in the form of a programmatic thesis that identified three procedures for acquiring knowledge that were grounded in three types of pre-scientific human interests:

> There are three categories of processes of inquiry for which a specific connection between logical-methodological rules and knowledge-constitutive interests can be demonstrated. This demonstration is the task of a critical philosophy of science that escapes the snares of positivism. The approach of the empirical-analytical sciences incorporates a *technical* interest; that of the historical-hermeneutic sciences incorporates a *practical* one; and the approach of critically oriented sciences incorporates the

> *emancipatory* cognitive interest that, ..., was at the root of traditional theories (Habermas, 1971: 308 [emphasis in the original]).

In its early formulation, Habermas' general theory of knowledge was oriented to the elaboration of an epistemological justification for three categories of knowledge that had differentiated out from a comprehensive concept of knowledge in the transition to modern society. In *Knowledge and Human Interests*, however, Habermas used a language that implied that he was elaborating an epistemological justification for a comprehensive theory of knowledge within only one of the spheres of value that Weber had identified in his analysis of the disenchantment of reason in modern society. To the extent that his orientation in *Knowledge and Human Interests* was an orientation to the value sphere of science, his objective in the epistemological phase of his project is more appropriately understood as an effort to produce a general theory of science, rather than a general theory of knowledge. The ambivalence in his overall objective at this stage also extended to the claim that his theory of knowledge was a theory with practical intent. Given the emphasis placed on the value sphere of scientific knowledge, it would appear that Habermas was seeking to establish a link between theory and practice that privileged the rational authority of science and reduced practice to a form of rational scientific procedure.

Between the publication of *Knowledge and Human Interests* (1971) and the two volumes of *The Theory of Communicative Action* (1984), Habermas turned away from the goal of establishing an epistemological justification for a general theory of knowledge. In the place of his epistemological goal is the more general goal of

developing a comprehensive theory of rationality as it has emerged and developed in modern society. With this shift Habermas accomplished two major tasks that are important for the development of a critical social theory of society that claims to be both interdisciplinary and practical. Firstly, he moved out of the domain of a philosophical standpoint that is viewed as external to, and interested in, producing an analysis of rational validity claims within the value sphere of scientific knowledge. In other words, he moved out of the context of a relationship that was constituted and regulated in the form of a relationship between an observer and a subject. In making this move, he established a location for his critical social theory that, at the meta-theoretical level of intellectual discourse, occupies an interdisciplinary standpoint that is between philosophy and science. Secondly, Habermas explicitly identified the value spheres of moral-practical knowledge and aesthetic knowledge as being distinct from, yet structurally analogous to, the value sphere of science. Given this latter shift, Habermas' claim to be oriented to developing a general critical social theory of knowledge with practical intent has emerged as a more realistic claim. In the contemporary critical social theory literatures, Habermas' *Theory of Communicative Action* is widely recognized as the fulcrum for his overall project. In this study, the *Theory of Communicative Action* has been used as a primary resource for developing a conceptual framework to guide the empirical component of the research.

The third piece in Habermas' project that has relevance to the research carried out in this study is *The Structural Transformation of the Public Sphere* (1973). Chronologically, *The Structural Transformation of the Public Sphere* was a work that preceded the development of Habermas' more social-theoretical pieces. This piece is

also distinct from the others that have been identified in this discussion in that it incorporates an explicit empirical focus. In producing the *Structural Transformation of the Public Sphere,* Habermas' goal was to contribute to the development of a theory of democracy. Specifically, his task was to produce an historical empirical investigation of the social contexts and conditions for rational critical debate about public issues among private persons who are "willing to let arguments and not statuses determine decisions" in the bourgeois public sphere of political life between the seventeenth and mid-twentieth centuries (Calhoun, 1996: 1). The *Structural Transformation of the Public Sphere* has been used in this research for its elaboration of Habermas' concept of a public sphere in modern society.

2.3.2. Habermas' Theory of Communicative Action

Habermas' *Theory of Communicative Action* has been used as a primary resource for developing the conceptual framework that guides the empirical research in this study. In the *Theory of Communicative Action,* Habermas (1984) follows the tradition of critical social theory that was established by Marx and Weber, by advancing the claim that the emergence and development of modern society is appropriately understood as a process of rationalization. Habermas' social theoretical project departs from the projects of both Marx and Weber in that he conceives of processes of rationalization in modern society as including, and extending beyond, the rise to dominance of instrumental or purposive rationality. In Marx's project the rise to dominance of instrumental or purposive rationality had been identified as embodying an emancipatory potential while Weber had depicted rationalization in the form of instrumental or purposive rationality as contributing to a loss of freedom and autonomy.

For Habermas, it is the fundamental misunderstanding of rationalization as a uni-dimensional development, and extension of instrumental or purposive rationality that has impeded the development of critical social theory. The uni-dimensional development and extension of instrumental or purposive rationality is also identified by Habermas as a source of contemporary problems that have emerged in modern society more generally. One of his explicit meta-theoretical objectives is to avoid this misunderstanding by reconstructing a comprehensive account of the process of rationalization as a two sided process of cognitive-instrumental rationality and moral-practical rationality. The basis for this reconstruction is a rejection of the philosophy of the subject as a source of human consciousness and the adoption of a philosophy of language in practice as means to transcend the hegemony of a subjective understanding of human consciousness.

With the turn to a linguistic conception of human consciousness, Habermas grounds his theory of communicative action in the presupposition that communication is the fundamental condition for self-preservation and for the reproduction of the human species:

> If we assume that the human species maintains itself through the socially coordinated activities of its members and that this coordination has to be established through communication— and in certain central spheres through communication aimed at reaching agreement— then the reproduction of the species *also* requires satisfying the conditions of a rationality that is inherent in communicative action. These conditions have become perceptible in the modern period with the decentration of our understanding of the world and the differentiation of various universal validity claims (Habermas, 1984: 397 [emphasis in the original]).

Building on this presupposition, Habermas argues that the function of communication in

general, and the function of communicative action in particular are not equivalent. Rather, he advances the claim that there are essentially three concepts of social action that are potentially realized through the media of general communication. These:

> ...concepts of social action are distinguished ... according to how they specify the coordination among the goal-directed actions of different participants (Ibid: 101).

According to Habermas, the three concepts of social action include: (1) concepts of social action that are oriented to the utility or success of realizing particular interests within a social situation; (2) concepts of social action that are oriented to realizing a pre-existing agreement on hegemonic values and norms within a social situation; and (3) concepts of social action that are oriented to realizing mutual understanding through processes of cooperative interpretation about a social situation, within a social situation.

Having distinguished these different concepts of social action, Habermas argues that:

> In all cases [of social action] the telological structure of action is presupposed, inasmuch as the capacity for goal-setting and goal-directed action is ascribed to actors, as well as an interest in carrying out their plans of action. But only the strategic model of action *rests content* with an explication of the features of action oriented directly to success; whereas the other models of action specify conditions under which the actor pursues his goals— conditions of legitimacy, of self-presentation, or of agreement arrived at in communication, under which alter can "link up" his actions with those of ego. In the case of communicative action the interpretive accomplishments on which cooperative processes of interpretation are based represent the mechanism for *coordinating* action; communicative action is *not exhausted* by the act of reaching understanding in an interpretive manner (Ibid: 101 [emphasis in the original]).

In sum, Habermas is arguing that all social actions that are to be recognized as rational,

accountable and autonomous must emerge from, and ultimately return to the fundamental mechanism for coordinating social action which is a process of communicative action. On the basis of this fundamental idea of the rational core of social action Habermas has developed and advanced a discourse theory of truth and a discourse theory of moral conduct.

Habermas posits that it is the capacity of human beings to raise and defend validity claims in the contexts of everyday social interaction that is the primary historical force that enables both the integration of individuals into a social community and the individualization of individuals within that social community. Within Habermas' theory of communicative action, the conventional notion of communicating competence as a means to realize rational social coordination is replaced by a notion of learning and practicing communicative competence in public spaces as the source and means of both rational accountability and rational autonomy in society.

2.3.4. Social Learning within a Theory of Practical Argumentation

To develop his theory of rationality as a theory of communicative action, Habermas elaborates a theory of practical argumentation that functions simultaneously as a "court of appeal" in which to vindicate contestable validity claims, and as a process of social learning within contexts of everyday social interaction. As described by Habermas (1984: 17-18):

> ...the practice of rationality proper to the communicative practice of everyday life points to the practice of argumentation as a court of appeal that makes it possible to continue communicative action with other means when disagreements can no longer be repaired with everyday routines and yet are not to be settled by the direct or strategic use of force.

Habermas uses the concept of argumentation to refer to (Ibid: 18 [emphasis in the original]):

> [a] type of speech in which participants thematize contested validity claims and attempt to vindicate or criticize them through arguments. An *argument* contains reasons or grounds that are connected in a systematic way with the *validity claim* of a problematic expression. The 'strength' of an argument is measured in a given context by the soundness of the reasons; that can be seen in, among other things, whether or not an argument is able to convince the participants in a discourse, that is to, motivate them to accept the validity claim in question...In virtue of their criticizability, rational expressions also admit of improvement; we can correct failed attempts if we can successfully identify our mistakes. The concept of *grounding* is interwoven with that of *learning*. Argumentation plays an important role in learning processes as well.

Within a theory of practical argumentation, the connection of reasons or grounds to a validity claim that is thematized as problematic is neither deductively conclusive nor inductively verified. Rather, the logic of practical argumentation is a probative logic that is open to discursive redemption in social contexts where the participants are willing to "expose themselves to criticism and, if necessary, to participate properly in argumentation" (Ibid: 18). For Habermas practical argumentation is the reflective medium in which problematic validity claims can be thematized and vindicated in the intersubjective world of communicative reason.

With his theory of communicative action, Habermas has set out the framework of a theory of societal rationalization in the form of a two-sided process of rationalization. Within this framework, society is understood to develop as both a system and a lifeworld. As a system, society develops in the direction of an emphasis on instrumental

or purposive rational action that emphasizes the exercise of control, and the goal of success within historical contexts that are characterized by uncertainty and contingency. As a lifeworld, society develops in the direction of an expansion of the capacity for practicing communicative reason as a means to change the world in a direction that is oriented to achieving a rational consensus grounded in the realization of mutual understanding in contexts that are characterized by historical contingencies. As discussed in the previous section, Habermas conceives of "normal" processes of societal rationalization as processes in which there is a balanced development of purposive or instrumental rationalization and processes of communicative rationalization. In other words, Habermas conceives of normal processes of societal rationalization in terms of the balanced development of society as both system and lifeworld.

Habermas (1984) elucidates his comprehensive concept of rationality in the form of a system of validity claims that are amenable to justification through the processes and procedures of theoretical and practical argumentation in public spaces that are immune to any force, "other than the force of the better argument." According to Habermas, it is the argumentative form of communicative reason in the value spheres of science, law and morality, and art, that is the basis for any social organization that allows social actors to avoid resorting to eristic means of dispute resolution and to subordinate those means to the goal of developing intersubjective conviction as a basis for action in society. More specifically, Habermas (1984: 22) states that:

> Argumentation makes possible behaviour that counts as rational in a specific sense, namely learning from explicit mistakes. Whereas the openness of rational expressions to criticism and to grounding merely points to the possibility of argumentation, learning processes —

> through which we acquire theoretical knowledge and moral insight, extend and renew our evaluative language, and overcome self-deceptions and difficulties in comprehension— themselves rely on argumentation.

2.3.3. Habermas' Theory of Societal Rationalization

Habermas' theory of communicative rationality is at the centre of his critical social theory of society. With his concept of communicative rationality, Habermas shifts the critique of reason away from a Kantian conception of transcendental consciousness into the intersubjective social domain where individual and collective consciousness is understood to emerge out of participation in communicative action. This shift allows Habermas to advance a reconstructed conception of objective validity that is grounded in "reasoned argreement concerning defeasible validity claims" (McCarthy, 1999: 170). By emphasizing the test of defeasibility over the test of defensibility, Habermas establishes theoretical justification for invoking participation in rational critical discourse as a means to make mistakes and misunderstandings explicit, and to learn from those mistakes and misunderstandings in concrete social contexts. As elaborated by McCarthy (Ibid):

> The enlightenment project then becomes a matter of cultivating suitable forms of theoretical and practical discourse, and of establishing the institutions and practices required to give them social effect. In regard to theoretical discourse, this requires improving the cultural and institutional conditions for empirical research, theoretical inquiry, scholarly activity, and the like. In regard to practical discourse, it requires reforming the cultural and institutional conditions for moral, legal, and political deliberation and strengthening its role in our lives.

Ideas of reason within a communicative approach are understood to perform functions that are both constitutive and regulative of the social reality in which they are found and circulate. Moreover, the constitutive and regulative functions of reason are understood to be interdependent rather than oppositional, and embodied in a conscious and on-going commitment to the critique of actual cultural and social conditions that mediate theoretical and practical discourses in particular social contexts.

To develop his critical social theory of societal rationalization Habermas motivates the concept of communicative rationality for an examination of processes of rationalization at three levels of analysis (Habermas, 1984: 6-7). At the meta-theoretical level, the concept of communicative rationality is used to elucidate a conceptual framework for investigating the rationality of social action. Specifically, it is oriented to elucidating the differentiation of culture into the three value spheres of science, morality, and aesthetics. Each of these value spheres is differentiated and specialized in relation to one of the validity claims that constitute the concept of communicative rationality. These validity claims are truth, normative legitimacy, and authenticity, respectively. In this research, Habermas' comprehensive conception of reason as a system of analogous validity claims that can be defended with good reasons in contexts of communicative interaction is adopted as a meta-conceptual framework for grounding the research in a general theory of knowledge that is understood as a comprehensive theory of rationality.

At the methodological level of analysis, the concept of communicative rationality is motivated as an interpretive framework. Its task is to elucidate the meaning of a symbolic expression and to evaluate the validity claim that it implies. At

the empirical level, the concept of communicative rationality is motivated to assess "whether and in what sense the modernization of society can be described from the standpoint of cultural and societal rationalization" (Ibid: 6). Overall, the reconstructed concept of communicative rationality is advanced by Habermas to extend Weber's examination of the principles and logics of learning processes that characterize the value rational and instrumental rational action spheres of modern society (Habermas, 1995).

In *The Theory of Communicative Action*, Habermas defends the thesis that both traditional and critical social theories have misunderstood modernity as a one-sided process of purposive-rational rationalization (Habermas, 1984). In traditional social theory the selective rationalization of society as purposive rationality has been adopted as a normative criterion and has contributed to the migration of modern social theory into the domain of functionalist reason (Habermas, 1967). In the critical social theories of Marx, Weber, Horkheimer, Adorno and Marcuse, the selective rationalization of society as purposive rationality is equated with rationality per se, and advanced as a basis for rejecting modern rationality as fundamentally ideological. Habermas considers both interpretations to represent a misunderstanding of the nature of the contemporary condition. Within Habermas' theory of communicative action, rationalization is understood as an interrelated process of extending instrumental rational action and as extending the potentials for communicative rational action. In a balanced process of rationalization that has the capacity to realize the emancipatory potentials of modern society, opportunities must be created to realize the positive potentials of both cognitive-instrumental reason and moral-practical reason.

2.3.5. Social Learning as Argumentation in The Public Sphere

In *The Structural Transformation of the Public Sphere*, Habermas (Habermas [1973] in Seidman, 1989: 232) defines a public sphere as that:

> ...domain of our social life in which such a thing as public opinion can be formed. Access to the public sphere is open in principle to all citizens. A portion of the public sphere is constituted in every conversation in which private persons come together to form a public. They are then acting neither as business or professional people conducting their private affairs, nor as legal consociates subject to the legal regulations of a state bureaucracy and obligated to obedience. Citizens act as a public when they deal with matters of general interest without being subject to coercion; thus with the guarantee that they may assemble and unite freely, and express and publicize their opinions freely.

The analytical concept of a "public sphere" is used in this research as an ideal type. Its function is to aid in the identification of exemplary situations of communicative action in the practice of interdisciplinary conduct and inquiry within the university where the participants are free to practice the rational accountability and rational autonomy of public reason. In other words, the public sphere is used as an ideal concept to identify those public locations where social conditions for practicing the constructive and critical standards and principles of theoretical and practical reason are consciously established by participants and are immunized from the contingencies of the social context.

2.4. Conclusion

This chapter reviewed selected literature relevant to investigating the rational basis for asserting an ethical position for progressive academic inquiry and conduct in

the practice of interdisciplinary science with policy intent within the university sector. These literatures were reviewed in terms of a juxtaposition of modern and post-modern debates in the discourses of modernity, and a juxtaposition of positivist and post-positivist debates in the normative discourses of science in modern society. It has been argued in this chapter that at the meta-conceptual level of the discourse, debate over the rational basis for asserting an ethical position for progressive academic practice appears to be at an impasse. This impasse is currently being constituted between a reinvented historicism and a revitalized scientism.

The meta-conceptual social theoretical framework of Habermas' theory of communicative action has been identified as a potential way out of the apparent impasse. Specifically, it has been argued that the adoption of Habermas' reconstruction of a comprehensive theory of rationality in modern society provides a basis for investigating the processes and procedures of the interaction of rational accountability and rational autonomy in the public spaces which are constituted and regulated through the communicative actions that individuals engage in, in their everyday practices. In the next Chapter, these arguments are extended through a discussion of the methodological strategies that have been drawn on to operationalize Habermas' conceptual framework for the empirical investigation of how these practices transpire within the everyday interactions of university research faculty who are involved in the practice of interdisciplinary research with practical intent.

CHAPTER THREE
METHODOLOGY

A central objective of this study is to investigate the way in which political and economic structures shape and, in turn, are shaped by discursive practices in social interaction (Giddens, 1984). A qualitative research methodology was required to capture the dualism of participant and observer perspectives within an applied critical social theory framework. A review of alternative qualitative methodologies resulted in the selection of the extended case study method (Burawoy, et al. 1991) as the method most suited to investigate the research question.

The extended case study method is a form of critical ethnography that uses participant observation to study social interaction in natural settings. These observations are subsequently interrogated to specify what is 'interesting' and 'surprising' in the social situation (Burawoy, 1991). The purpose of the interrogation is to specify those particular features of the social situation that do not fit the expectations derived from exemplary social theory. Instead of dismissing the anomalies as 'noise', or rejecting the theory as a failure, the goal is to reconstruct or extend promising social theory by locating the social situation in its historical context of determination.

This chapter presents the logic of the extended case study method and establishes the rationale for its selection as a research methodology for investigating the processes and procedures of interdisciplinary science within the university. The

procedures followed in data collection, management and analysis are presented. It discusses the ethical and technical issues that arose during the course of the research and addresses the primary limitations of the research.

3.1. Logic and Rationale for the Selection of the Extended Case Study Method

The extended case study method is a form of critical ethnography that mediates between data and theory. It uses the data generated through participant observation to evaluate and reconstruct, or extend theoretical generalizations. Combining the techniques of ethnography with a genealogy of macro-level structural forces, the extended case study method is well suited to investigate how relations of community and individuality, accountability and autonomy are reproduced and transformed through discursive practices in social interaction. A primary benefit of the method is that it provides a framework for linking micro- and macro-level observations to macro-theoretical frameworks.

Within a critical social theory framework that is located within the theory of communicative action, actual discursive practices are an important site to observe how social actors "re-elaborate and reproduce their own social organization as they shape patterns of belief, consent, identity, and problem formulation" (Forester, 1992: 60). Specifically, micro-level investigations of the structure of discursive practices in practical decision-making contexts allow for observations of the processes and procedures through which social relations of accountability and autonomy are produced, reproduced, and extended by social actors.

Burawoy (1991: 3) describes participant observation as the "paradigmatic social

science" because its goal is both understanding and explanation — the hermeneutic and the scientific dimensions of social science. The goal of the participant observer is to strike a balance between the 'subjectivity' of the insider and the 'objectivity' of the outsider. This balance is achieved by constructing an actual or virtual dialogue in two directions. As observer of the social situation, the researcher seeks to *learn about* the situation by developing a reciprocal relation with the self-expressed understanding of the people studied. As participant in the academic community of social science, the researcher seeks to *learn from* the social situation by developing and promoting a reflective relation to the established consensus within the social science community.

The orientation to linking micro- level observations to macro-level generalization distinguishes the extended case study method from alternative ethnographic methodologies that use participant observation. For example, traditional ethnographers use participant observation to produce "thick descriptions" of a total cultural system or domain (Geertz: 1973; Spradley, 1980). Because the primary objective is to achieve holistic understanding of the case, abstraction and generalization from the local and historically specific context is limited to typifications of shared understandings (Poland: 1992). In Glaser and Strauss' (1967) grounded theory method, theoretical generalization is an explicit goal. The theory, however, is grounded in empirical observations and generated from these data through an on-going process of data collection, coding, and constant comparative technique. Discovery and justification are construed as a single process and the theorist's explicit goal is "to enter the research with as few predetermined ideas as possible— especially logically deductive, a priori hypotheses" (Glaser, 1978: 3). In contrast, the extended case study

does not presume a tabula rasa, nor does it ascribe to a doctrine of immutable truths. Rather the goal is to generalize at the level of theory by using data generated from case studies to reconstruct or extend exemplary theories. As described by Burawoy (1991: 6-7), the objectives of the extended case study method are to:

> ...search for theories that highlight some aspect of the situation under study as being anomalous and then proceed to rebuild (rather than reject) that theory by reference to the wider forces at work, be they the state, the economy, or even the world system. ...The dialogue between participant and observer extends itself naturally to a dialogue among social scientists— a dialogue that is emergent rather than conclusive, critical rather than cosmetic, involving reconstruction rather than deconstruction.

The extended case study method practices C. Wright Mills' sociological imagination by connecting "the personal troubles of the milieu" to "the public issues of social structure" (Mills, 1980 [1959]: 8).

A second reason for selecting the extended case study method was its demonstrated potential as a methodological framework for advancing the project of applied critical social theory. As described by Parkin (1996: 425), "applied critical theories investigate both the threats to freedom and the possibilities for emancipation that obtain for a particular collectivity in a particular time and place." In a similar vein, Forester (1985) has argued that applied critical social theories are an important means to identify opportunities for, and impediments to, the extension of democratic practices in society. Parkin (1996) and Forester (1992) concede, however, that efforts to systematically appropriate the categorical framework of Habermas' theory of communicative action for applied critical social theory (Young, 1989; Misgeld, 1985;

Welton, 1985) are limited in quantity and scope. It remains an open question whether these lacunae warrant a rejection of the conceptual framework (Held, 1980; Roderick, 1986; Heyderbrand and Burris, 1984; Ruane and Todd, 1988), or a need to innovate at the level of methodological practices.

The need for innovation at the level of research methodologies is an insight of post-modern and feminist challenges to modern social science (Rosenau, 1992; Reinharz, 1992). Both perspectives posit that the monological form of conventional research methodologies conceal a sub-text of power differentials through which social relations between researchers and research subjects are constituted. The effect is to produce systematically distorted accounts of social reality that privilege the generalizing knowledge of experts, while at the same time marginalizing or suppressing the validity claims of local and particular knowledges. To correct for the anti-democratic form and effect of modern social science, post-modernists and feminists advocate the adoption of standpoint methods of inquiry. There is no established consensus, however, as to what standpoint inquiry means in practice. As the arguments set out in Chapter Two suggest, it is unlikely that a consensus will be achieved as long as the debate over standpoint inquiry is framed as a uni-dimensional choice between adopting the standpoint of the detached observer, or adopting the standpoint of the interested subject. To the extent that these debates retain subterranean ties to a philosophy of the subject and a paradigm of subjective consciousness, it is unlikely that the issue will be resolved.

One solution to the dilemma is to adopt the theory of communicative action as the epistemological ground for the research process. From a standpoint of communicative action, the task of the researcher is to view each encounter with research

subjects as an entry point into a dialogical process. In other words, the researcher's task is to enter into a process of discovering and making visible the communicative actions that Habermas (1984) has elaborated as the problematic of the lifeworld.

Situating the researcher in the communicative action of the everyday world displaces her/his status as legislator of general truth or interpreter of multiple truths (Seidman, 1989; Bauman, 1987). Rather, the researcher assumes a more modest and dynamic role as the embodiment of a communicative ethic within a process of inquiry that is socially organized and oriented to the ideal of realizing mutual understanding. In a mode of communicative action the standpoint of inquiry is reconstructed communicatively as a dialogical social learning process that creates the potential for a more meaningful engagement between researchers and research subjects.

In *Ethnography Unbound*, all of the authors used the extended case study method to investigate a singular aspect of the larger social reality from the standpoint of communicative action. Summarizing the substantive theme of the collection, Burawoy (1991: 1-2) states:

> All the studies examine how power and resistance play themselves out in social situations that are invaded by economic and political systems. They highlight what Jurgen Habermas calls the colonization of the lifeworld by the system. In the face of commodification through money and administration through power, everyday life loses its autonomy and shared purpose. But their analyses do not simply record this colonization, they also explore resistance to it in the forms of negotiated orders, alternative institutions, and social movements.

Each of the authors demonstrated the utility of the method for making visible the

discursive practices and procedures involved in the production of new social meanings and new social relationships within social contexts that are framed and shaped by institutional and historical forces. Their discovery of multiple forms of resistance to the instrumentalizing powers of societal rationalization demonstrated the usefulness of the method for advancing the project of applied critical social theory. The authors accomplished this task by demonstrating that the categorical framework of applied critical social theory is internal to the problematic of the everyday world. In summary, the extended case study method presented a promising strategy for investigating issues concerning the practical relevance of critical social theory for informing the investigation of interdisciplinary science within the university.

3.2. Design of the Case Study

One traditional criticism of the case study as a research strategy is that it lacks rigor and therefore violates the scientific norm of intersubjectivity (Yin, 1989). The purpose of this section is to address that criticism by providing a detailed description of the decisions and procedures followed in the research. The description of the research design is intended to allow other researchers to investigate similar problems and questions in comparable social situations. The related issues of significance and generalizability are addressed in the following section.

To prepare for the field research component of the study, several methodology texts and journal articles on case study research design and ethnography were consulted. Yin (1989) provided an especially useful guide to the logic of case study research design and instruction on how to construct a case study protocol. Fetterman (1989), Shaffir and Stebbins (1991), and Smith (1987) provided useful insights into the

technical aspects of conducting ethnographic research. Both Smith (1987) and Burawoy, et al. (1991) were used to identify and address issues of validity and reliability related to the interpretation of case study findings.

Theoretical, substantive, and pragmatic criteria guided the selection of *The Sustainability of the Semi-arid Prairie Eco-System Study* (PECOS) for the case study in interdisciplinary science. One of ten projects funded under Canada's Tri-Council Green Plan Eco-Research Program, PECOS was mandated to: (1) develop a process for conducting scientific research that integrated expertise from the social sciences and the humanities, the health sciences, and the natural sciences and engineering; (2) produce fundamental and practical knowledge about complex environmental issues; (3) provide graduate and post-graduate training in interdisciplinary science relevant to environmental issues; and (4) inform policy level decision making on environmental problems within various sectors of Canadian society. Overall, the program and project exhibited several of the characteristics typically attributed to the new paradigm for scientific inquiry (Gibbons, et al., 1994). These features included the emphasis placed on interdisciplinary research and training, policy relevance, and the formation of partnerships with stakeholders outside of the academic community and government. The Eco-Research Program and PECOS also exhibited several interesting anomalies.

Philosophically and practically, the program and project were conceived within an emergent paradigm of sustainable development (Doern and Conway, 1994). In contrast to the more entrenched liberal economic-growth paradigm for environmental politics and policy the concept of sustainable development advances an ethos of common interest over private or particular interest (Dickinson, 1998/99). The meaning

of an ethos of common interest within a paradigm of sustainable development, however, is not explicitly defined. Rather, it is advanced as a principle that is relatively open to discursive definition and redefinition in particular contexts. Located within this alternative paradigm, PECOS and the Eco-Research Program provided a sharp contrast to other strategic funding initiatives, such as Canada's National Centres of Excellence Program (NCE), that are explicitly tied to advancing the competitive interests of the nation within a context of globalization. At the philosophical and meta-conceptual level, the Environment Canada Tri-Council Eco-Research Program and the PECOS Project provided an opportunity for collaboration in a context in which particular goals were to be established as part of the interdisciplinary process and were not pre-determined in advance.

The scope and depth of integration and interaction set out in the PECOS project proposal was a second factor that guided the selection of PECOS as a focus for the case study. By design, the research project required interaction and collaboration across multiple and multi-valent boundaries that included and extended beyond the boundaries of conventional academic disciplines. For example, at the meta-conceptual level the project was designed to cross epistemological, historical, and spatial boundaries. At the level of theory, method, research, and pedagogy, the project was constructed to facilitate interaction across boundaries within individual disciplines, across the boundaries of different disciplines and across areas of professional expertise. Finally, the project proposal was designed to achieve interaction and collaboration between the university and its various external stakeholders and publics, including government, industry, and residents of the study area. The intent to include study area residents in

the planning and operational phases of the research process was a particularly interesting feature of the PECOS project.

A third and important consideration in the selection process was the willingness of members of the PECOS management team and PECOS study participants to accommodate this study of interdisciplinary process into the planning, operational, and research phases of PECOS. This cooperation was crucial in gaining access to relevant data collection sites and obtaining documentary materials essential to the production of a holistic understanding of the interdisciplinary process of PECOS. One aspect of this cooperation was demonstrated in the constitution of the graduate advisory committee for this study. Three of the members of the supervisory committee were members of the PECOS management committee who occupied disciplinary and professional positions outside of the discipline of sociology. In their roles as thesis advisors, specialists in disciplines outside of sociology, and principle investigators in PECOS, these individuals created an important channel of communication between this study and perspectives in PECOS that were outside of the boundaries of a sociological perspective. Given the grounding of the study in the framework of a theory of communicative action, a study of this nature would have been difficult and perhaps impossible to carry out in the absence of this level of cooperation and participation. The ethical issues related to this structural condition of the research study are discussed later in the chapter.

A final consideration in the selection of an empirical focus for the case study was the common physical location for my program of study and the PECOS project. At the outset, this consideration was primarily pragmatic. It was a consideration that

related to concerns about access and the availability of material resources to complete this kind of project in an alternate location. In retrospect, the common location proved to be advantageous in allowing me to draw on a basic and tacit familiarity with the institutional and cultural context of the project.

Prior to initiating the participant observation component of the study, a preliminary investigation of the situational context of PECOS was undertaken. Included in the investigation was an examination of documents describing the goals and objectives of the program and the project, respectively. In addition, informal discussions of the program and project were carried out with key informants from the Research Services Office of the University of Saskatchewan and selected co-principal investigators from the PECOS project. The purpose of these preliminary investigations was to gain an overall impression of the institutional and individual motivations and interests that were influential in the formation of PECOS.

3.2.1. Time Frame

The field research component of the study was conducted over a two-year period ranging from May, 1994 to June, 1996. Entry to the field coincided with the PECOS Management Committee's notification that the project would receive funding, pending a fifty percent reduction in the original budget request. Exit from the field coincided with PECOS' submission of its second annual progress report to the Tri-Council Eco-Research Program. Several factors contributed to the decision to terminate field observations at this stage in the overall life of the project.

One important factor in deciding to terminate the field research component was the quantity of text-based data that was generated. During the two-year period of

participant observation, approximately 355 hours of meeting time were audio taped within the public spaces that constituted and regulated the PECOS project. For each hour of audiotape collected, an additional three to four hours were required to transcribe and clean the data for analysis. The time investment required for data processing was compounded by the fact that audiotapes were produced in meeting contexts with ten or more people attending and participating in the deliberations. The need to capture both discursive and non-discursive information relevant to an interpretation of these situational contexts severely limited the extent to which technical assistance could be used to transcribe and prepare the data for analysis. For example, in interview contexts, the recognition of speaker, listener, and respondent roles in communication is pre-structured and relatively straightforward. In the context of meetings, the recognition of speaker, listener, and respondent roles is embedded in the flow of communication. Because these recognitions are embedded in the performative dimensions of "talk" within a social context, the embedded information is not easily identified from the perspective of someone who has not attended the actual meeting. To maximize the internal integrity of the data set, I assumed responsibility for all of the transcribing. As the study progressed, it became increasingly apparent that transcription of all of the audiotapes that were collected would be an unrealistic goal. The direction that the analysis followed as it developed also indicated that it would be unnecessary to transcribe all of the audiotapes for the realization of the objectives of this study. Consequently, as the field research component and analysis of data progressed, the transcription of the audiotape data became increasingly selective and was oriented to the detailed investigation of exemplary as opposed to typical communication situations

within the project.

The overlap between data collection and data analysis provided a second reason for exiting the field. At the conclusion of the two-year period, a selection of exemplary communication situations that had emerged from the empirical observations warranted more detailed investigation in terms of the data that had been accumulated. At this stage it was also becoming increasingly apparent that events occurring within PECOS warranted an investigation of historical and situational factors that were external to the communications occurring within the project. Specifically, there was a need to investigate the historical and situtational forces that were institutionalizing, conditioning and limiting the discourse of interdisciplinary and policy relevant science within PECOS and the Canadian context more generally.

A third reason for exiting the field prior to the conclusion of the project was directly related to the design and goals of the study. The overall goal was not to produce a history of the project or to evaluate its development, operation, and realization of goals and mandate over the duration of its life history. Consequently there was no objective justification to systematically follow the project through to its completion.

3.2.2. Sources of Data and Methods of Data Collection

Three primary techniques of data collection were employed to construct the case study. These techniques included field observation, non-participant and participant observation, and the accumulation and indexing of documentary evidence. A summary of the components of the PECOS data set is provided in Appendix I.

1. Field Observation

A general impression of the field of interdisciplinary science within the university was obtained through my immersion in the lifeworld of the university. This included my status as a graduate student at the University of Saskatchewan, PECOS affiliate student, sessional lecturer in the Department of Sociology and member of the Budget Committee of University Council at the University of Saskatchewan. My involvement in these different dimensions of the lifeworld of the university were not all directly related to the study. They were useful, however, in sensitizing me to the complexity of the lifeworld of the university by providing opportunities to observe and experience the situational context of PECOS from a variety of different vantage points that constitute the everyday world of the university. For example, as a member of the Budget Committee of University Council, I acquired an insider perspective on the budgetary issues and processes that frame the different dimensions of all activities that occur within the university.

Additional opportunities for observing the situational context of PECOS were afforded by virtue of my status as a PECOS affiliate student. These included opportunities to travel with members of the PECOS research team to site visits within the PECOS study area and to one of the national workshops sponsored by the Tri-Council Eco-Research Program. An opportunity to attend an international conference on interdisciplinary science in environmental research also arose during the course of the study. Because this conference was sponsored in part by the Canadian Tri-Council Eco-Research Program, it provided an opportunity to observe and experience an additional public dimension of the program and of the project. Attendance at all of

these different locations provided useful opportunities to observe dimensions of the situational context of PECOS that were external to the case itself.

From these general field observations I concluded that the institutional boundaries of interdisciplinary science within a university context are not fixed. Rather, they are multiple, extended, dynamic, fluid, and interrelated. One interesting feature to emerge early in the field research was the apparent "bundling" of functional and extra-functional actions within the various institutional contexts of interdisciplinary science within the university. Specifically, distinctions between the three primary missions of the university: research and scholarly work, instruction and public service, appeared to be more conceptual than real in the everyday world of academic practice. This observation proved to be a crucial factor in selecting a conceptual framework for realizing the objectives of the research. Specifically, it pointed to the need to select a general theoretical framework that did not presuppose a conceptual or empirical division between the macro-level of social structure and the micro-level of human agency.

2. Non-Participant and Participant Observation

The major portion of empirical observations for the case study were generated through adoption of the role of participant-as-observer within the various communication contexts of the PECOS Project. These observations were recorded in the form of audiotapes and field notes, transcribed, and entered into the *Ethnograph* qualitative software program for analysis. The observations were initiated at the level of the PECOS Management Committee and extended out from that site as the project developed, evolved, and devolved over time. At the end of the field research

component, empirical observations had been collected from all of the sites of the project that could be accessed, given physical limitations and ethical considerations. These sites included meetings of the PECOS Management Committee; the three research foci; the information systems, questionnaire development, and student committees; and interdisciplinary seminars, the interdisciplinary course and various public functions that were sponsored by the project over the duration of the field research component of the study. Structural relations among these various sites are summarized in the PECOS organizational chart provided in Appendix II.

My role of participant-as-observer varied in relation to the different data collection sites. For example, in the student committee meeting setting and research foci meeting setting that established a location for my study within the project, my role tended to be that of a participant and observer. In the PECOS Management Committee meetings, other research foci meetings, and various sub-committee meeting settings, my role tended to be that of an observer rather than participant. In all of the data collection sites my primary role as a researcher was always made explicit. Because my primary role in all of the data collection sites was that of a researcher, I was seldom asked to report on happenings in other data collection sites. Further, I did not offer to provide information about happenings in other data collection sites, except in those instances where the information was a matter of public record within the overall communication context of the project.

3. Documents

Documentary evidence was collected before, during, and following the completion of the field research component of the study. At the completion of the study

the file of documentary evidence had expanded to fill six large binders of information indexed according to the site from which the information had originated. The materials collected as documentary evidence included program descriptions, project proposals, meeting agenda, minutes, reports, maps, questionnaires, newsletters, correspondence, memos, press releases, newspaper articles, brochures, researcher biographies, and intranet bulletin board communications. In sum, the documentary evidence consisted of a record of all of the publicly available material artifacts that were generated over the life of the PECOS project.

These documents were a valuable resource for following flows of information through the project and for observing communications that occurred outside and among the formal meeting sites. The documentary materials were also useful for identifying the loss of discursive communications that arose within particular meeting contexts and that failed to flow through to other sites within the project.

3.2.3. Data Analysis and Data Presentation

The extended case study method relies on two interdependent levels of analysis— empirical and conceptual. The empirical level of analysis focuses on the data generated by the field study. The *Ethnograph V.4 and V.5* qualitative software packages were used to process, manage, and subject the empirical data to systematic analysis.

Seidel (1998: E-1) describes the idea of qualitative data analysis (QDA) as a "symphony in three notes: noticing, collecting and thinking about interesting things". Like a symphony, QDA is not a linear process. Rather, it is a complex process that develops in an iterative, progressive, recursive, and holographic way. The *Ethnograph*

facilitates this process by functioning as both a system of data management and a system of data analysis for text based data.

Audiotapes collected during the field research component of the study were transcribed verbatim and entered directly into the *Ethnograph Text Editor* component of the program. These files were imported into the *Ethnograph* program and transformed into numbered files for sorting, sifting, partitioning, and reconstituting in relation to developments at the conceptual level of analysis. Selected items from the documentary evidence file were scanned into a word processor program and subjected to a similar process. Selected aspects of information compiled in the form of written field notes were embedded into the original transcripts or attached to files in the form of memos.

Numbered files were initially partitioned or "coded" to gain a sense of emerging themes. These codes operated as heuristic devices to look for "interesting" and "surprising" themes and to discover aspects of the social situation that warranted more intensive analysis and investigation. The capacity to electronically sort codes, collapse some categories and elaborate others, or to discard or alter codes to better reflect emergent themes greatly facilitated the reduction and refinement of the volume of data generated. Individual segments and reconstructed segments that were extracted from the data set for detailed examination could be reinserted into their original locations to avoid losing sight of the meaning of a particular piece within the context of the bigger picture. Listening to the audiotapes while interrogating entire transcripts, or selected segments within the transcripts proved to be a useful strategy for recapturing performative aspects of the flow of communicative actions that were lost in the mediation of these data from a verbal to a textual form.

The global analysis of these data was used to map the terrain of PECOS as an historically emergent process in the context of broader historically emergent processes that are documented in selected secondary literatures. These findings are presented in Chapter Four in the form of a genealogy of the PECOS case.

As analysis proceeded, examples of argumentative discourses were identified and extracted from the secondary data files. These extractions were recombined into several types of tertiary files to allow for a more detailed examination of the process, procedure, and effect of argumentative discourses in the constitution and regulation of the various public spaces of the project. One set of tertiary files was constructed so that a particular argumentative discourse could be followed through the various public spaces of the project. A second set of tertiary files was constructed to allow for a comparison of the types of argumentative discourses that shaped the social rational character of different public spaces of the project. A third set of tertiary files was constructed to enable a comparative examination of the process and procedure of these argumentative discourses in shaping the social rational character of the project, and reshaping the institutional rational character of the university. The empirical examples and conceptual categories that were distilled from this data reduction process provide the evidential basis for the discussions in Chapter Five and Chapter Six.

3.3. The Science and Sociology of the Extended Case Study Method

The technique of participant observation typically confronts two fundamental criticisms: "first, that it is incapable of generalization and therefore not a true science and, second, that it is inherently 'micro' and ahistorical and therefore not true sociology" (Burawoy, 1991: 271). The extended case study method addresses these conventional

criticisms in ways that set it apart from alternative qualitative methodologies.

The issue of singularity or non-generalizability is a source of conventional criticism concerning the technique of participant observation as a scientific method. Because participant observation is situation specific and cases are usually selected using non-random sampling criteria, there are no theoretical criteria for assessing their generalizability. The issue of singularity also arises in relation to the social proximity of the observer to the case and the potential that is created for disrupting the natural processes of the social situation. These criticisms tend to warrant conceptions of methods that use participant observation as inherently exploratory "until ... results are tested in a sample of cases carefully selected from a population" (Burawoy, 1992: 272). The level of analysis of participant observation raises questions concerning the sociological significance of the technique. By definition, participant observation involves the study of micro-level interaction in historically and socially specific contexts. Consequently it is seen to be inherently micro and ahistorical. Different methodologies that use the technique of participant observation respond to these criticisms in different ways. The examination of these different responses is a useful way to highlight and discuss the responses provided by the extended case study method.

Ethnomethodological and interpretive methodologies respond to both criticisms by challenging and dismissing the premises that ground the criticisms. Within an ethnomethodological framework, the objectivity of external reality is challenged and reduced to the effects of subjective actions within particular contexts. According to Burawoy (1991: 272), the task of the ethnomethodologist is to "elaborate the cognitive accomplishments that make social interaction possible ... accomplishments that include

the social construction of abstractions that constitute both general and macro phenomena." Given the discussion of postmodernity in Chapter Two, ethnomethodologists view external reality in terms of the constructivist effects of language within a philosophy of consciousness paradigm.

Within an interpretive framework the particular or micro is viewed as a symbolic expression of the general or macro level structure. The parts are understood as a realization and expression of the whole that is to be clarified through the processes of thick interpretation (Denzin, 1989; Geertz, 1973). The interpretive methodologist emphasizes the contextualist nature of discourses and their limiting effects on human agency (Dreyfus and Rabinow, 1983). Within an interpretive framework, the micro is the macro. Burawoy (1991: 273) points out that "ethnomethodology makes a virtue of necessity and reduces sociology to the micro and particular, whereas the interpretive case method fuses the micro and the macro ... into a single expressive totality". In contrast, grounded theory and the extended case study method view micro and macro levels of reality as distinct and causally related.

Grounded theory uses analytical induction within a tradition of positivist empiricism to address the problem of the interrelation of micro-level observation and macro-level generalization. Generalization emerges from the intensive coding of substantive data and constant comparison of dissimilar cases (Glaser and Strauss, 1967). The goal is to discover new theory in natural settings and to produce law-like, or generic explanations of social phenomena. The universality of the explanation increases as an increasing number of particular situations are encompassed within a common conceptual category. In this respect, the grounded theory approach operates

on principles that are in some ways comparable to Weber's ideal type. It differs from Weber's ideal type, however, in that it does not explicitly incorporate an historical dimension.

The significance of grounded theory explanation is understood in terms that are analogous to statistical significance. By studying and encompassing an increasing number of like situations within a common conceptual category, grounded theory follows a logic of generalizing from a sample of similar situations to the population of all such situations. Causal explanation within a grounded theory approach emerges from processes of abstraction and simplification. As such, it is an approach that understands causality in terms of relationships among and between variables. Overall, grounded theory adopts a normative position that locates rationality within the individual and thereby, either presupposes or dismisses the possibility that normativity arises out of conditions of intersubjectivity. As described by Burawoy (1991: 282), "Glaser and Strauss self-consciously aim to develop theories that will enhance the control participants exercise over their situations". As a form of social engineering, its roots are grounded within a one-dimensional conception of rationality that takes the form of instrumental or purposive rationality.

The extended case study method uses processes of deconstruction, reconstruction, and reconstitution within a post-positivist framework to gain access to the dynamic social world of intersubjectivity. Generalization emerges from the constitution of a dialogical relationship between the particular and concrete of everyday social practice and the ideal world of the universal and abstract. It seeks to construct genetic explanations that account for actual outcomes in concrete social situations. The

universality of explanation within the extended case study method is understood to reside in its capacity to improve and extend existing social theory so as to improve the capacity of theory to enable social actors to realize their potential to achieve mutual understanding in their everyday lives. The significance criterion of explanation within the extended case study method is its societal significance. Significance resides in what the case tells us about the world that it is embedded in (Burawoy, 1991). Causality is multi-dimensional and historically specific with a generalizing potential. The normative position of the extended case study method is to view rationality as consciousness that is produced in the intersubjective world and as such, is subject to the same conditions and limits that constrain or enable the capacity of individuals to freely participate in the intersubjective world. As described by Burawoy (282):

> It takes the social situation as the point of empirical examination and works with given general concepts and laws about states, economies, legal orders, and the like to understand how those micro situations are shaped by wider structures.

The self-conscious standpoint of the extended case study method is social participation. Its aim is to promote dialogical relations that are oriented to improving both analysis and social action in the interest of promoting both progressive change and progressive control. Given the logic of the extended case study method, it is a methodology that is consistent with the goal of extending applied critical social theory within Habermas' meta-conceptual framework of a theory of communicative action.

3.4. Ethical Issues

Given the conceptual framework, methodological approach, and substantive

focus of the case study, three ethical issues arose and needed to be addressed over the course of the research. Although interrelated, these issues are usefully classified as objective, subjective, and intersubjective. The nature and resolution of each of these categories of ethical issue will be discussed in turn.

Those ethical issues that fell into the objective category were of a conventional nature. The primary concerns related to issues of voluntary participation, informed consent, anonymity, and confidentiality. The measures taken to resolve these issues were guided by the standards that universities and the federal research granting councils have established for the conduct of research with human subjects. Because all of the data for this study were collected in social settings that were public or quasi- public, the issues of voluntary participation and informed consent were addressed in a manner suited to the collection of data in a group setting. A verbal description of the study, its purpose, method, and anticipated implications was provided in all settings. Included in this description was a request for participation, an explanation that participation and consent were voluntary, and an acknowledgment that consent to participate could be withdrawn at any time. The verbal presentation concluded with an invitation to respond to questions that persons in the setting had about the research. In the quasi public settings, such as management committee and research foci group meetings, the request for participation was generally responded to by participants passing a motion that attested to their understanding of the research and their consent to participate. Because many of the settings were visited on an ongoing basis, this process would be repeated when new persons entered the setting or if there was a request that it be repeated. Some of the PECOS settings were pre-defined as private and were systematically excluded

from the study. For example, the PECOS Graduate Studies Subcommittee fell into this category and was excluded from the field data collection component of the study. At other times, portions of meetings were excluded because the substance of the deliberations involved the personal circumstances of an individual.

The issues of confidentiality and anonymity as they relate to individual participants have been respected to the extent that it is feasible to do so in a study of this nature. For example, some persons, by virtue of the position or status that they occupied in the project and university, may be identifiable. The possibility of this occurring was acknowledged and voiced at the time that the request for participation was made. In relation to the project, program and universities a decision has been made to retain their identities in the document. The decision was made for a number of reasons. Firstly, the project and the institutions that provided a context for the study were and are public institutions. Secondly, the data were obtained in the public and quasi-public settings of those entities. Finally, it is important to acknowledge that research in this study is oriented to an evaluation of a body of social theory and the societal significance of that social theory and not to an evaluation of the institutions or individuals who constituted the project.

Ethical issues arising from the intersubjective and subjective aspects of this study tended to fall outside of the issues that are conventionally addressed in the established standards and methodological literatures. The interpretive study of other human subjects in their natural environments inevitably privileges the will of the interpreter over the intended meaning of the subject. The interpretive study of other subjects in their subject domain by an interpreter in another subject domain is

something of a double jeopardy of will imposition. In this interpretive study of subjects in interdisciplinary science, several subject domains have been crossed simultaneously and no doubt some misinterpretations have been made. The interpretations have been made cautiously with this risk in mind and responsibility is assumed for the misinterpretations that have been made.

In the subjective category, ethical issues arose in relation to being allowed the freedom and autonomy to cross the traditional boundary between student and faculty roles and presume to interpret and evaluate the actions and motivations of faculty as research subjects. It would be dishonest to attempt to pretend that this was not an unnerving task. To the contrary, the task of studying and analyzing faculty interactions in the everyday context of the university was very unnerving at times. It is important to note, however, that the reason for concern in presuming to interpret the actions and motivations of the faculty participating in the PECOS project did not arise from any action on the part of faculty to interfere with the process or to influence the kinds of interpretations that were emerging. Rather, it was a subjective limitation that had to be overcome through an intersubjective learning process in order to advance validity claims concerning the actions and motivations of faculty. While a concerted effort has been made to put this learning process into practice, responsibility is assumed for those instances where interpretations have been distorted by virtue of an unintended privileging of self-interest over the opportunity to practice academic freedom and autonomy.

3.5 Limitations of the Research

One of the primary limitations of the research arose from the amount of data that

was collected. The amount of data that was collected in the form of audio-tapes of communications within the public spaces of the PECOS project, and the transcripts that were produced from these tapes, far exceeded the actual amount of data that were needed to address the research question within the conceptual framework of a theory of communicative action. These data also exceeded the amount of information that could be reasonably processed and subjected to an exhaustive analysis in the context of any one study. Consequently, there are themes and relationships that remain embedded in the data that warrant analysis in order to obtain a fuller understanding of the practice of interdisciplinary science within the university. Given this condition of the data set, the analysis carried out in this study must be considered only a slice of the overall analysis that might be carried out with the data set.

In retrospect, the limitation of an excess of data and the emphasis that the extended case study method places on establishing a real or virtual dialogue with the data and relevant literatures introduced additional limitations into the research. In particular, the time required to manage and become reasonably conversant with the data that were generated resulted in a loss of opportunities to establish dialogical relations with several of the persons who were participating in the case study at the same time that the field component of the study was being carried out. Had this strategy been incorporated into the research methodology from the outset, some of the uncertainty that enters into the interpretation of the meaning of validity claims that are advanced in the context of actual conversations may have been reduced or eliminated through interviews with the research subjects. At the same time an additional source of evidence would have been available to establish and warrant the validity of the claims

that are advanced in the interpretations of field data. Constituting more explicit dialogical relationships with this research study and the PECOS participants as individuals, or as groups, throughout the process would have been more consistent with the dialogical principles that ground both the methodology and the conceptual framework. Given that the arguments and interpretations set out in the dissertation must be defended to some of the persons who were participants in the PECOS process, a structural opportunity to compensate for this limitation remains available.[2]

3.6. Conclusion

The logic and rationale for selecting the extended case study method for the investigation of interdisciplinary science in the university has been discussed in this chapter. The extended case study method was adopted for the research in this study to enable linkages to be drawn between micro-level field observations and macro-level

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The task of validating the interpretation of empirical events with selected members of the PECOS Management Committee was undertaken at a meeting of the thesis advisory committee prior to the decision to allow the dissertation to proceed to defense. During the meeting, faculty thesis advisors who had also participated as research subjects in the case study were asked to draw on their recollection of the empirical events selected for analysis in the dissertation and to voice their agreement, or disagreement, with the interpretation of those empirical events. In the course of that discussion, the faculty advisors/research subjects noted that with the passage of time since the actual events the research subjects' interpretations of their meanings and motivations in the situations may have changed. There was a general consensus expressed, however, that they did not perceive any blatant discrepancies between their recollections of the events selected for analysis and the reproduction and interpretation of those empirical events in the dissertation.

theoretical generalizations. Specifically, the extended case study method enabled the investigation of the interaction of processes and procedures of rational accountability and rational autonomy in academic practice, without presupposing the constitution and regulation of the intersubjective world of academic practice. Further, the extended case study method does not ascribe to an ahistorical and decontextualized conception of the constitution and regulation of the intersubjective world of social interaction. Rather, it is a method that explicitly acknowledges the existence of system conforming forces that condition and limit everyday interactions in the lifeworld of social institutions.

The next chapter establishes an historical context for investigating micro-level interactions within the constitution and regulation of interdisciplinary inquiry and conduct within the university. The purpose is to produce a genealogy of the interaction of science and politics in the Canadian context. The strategy is to review selected secondary historical literature to identify the nature and form of state intervention into regulating academic practice at critical periods in the history of the institutions which establish the context for the case study. The results of the review of secondary historical literature are presented in Chapter Four. The findings from the extended case study analysis are presented in Chapters Five and Six.

CHAPTER FOUR
CONSTRUCTING THE CASE FOR INTERDISCIPLINARY SCIENCE IN PLANNING ENVIRONMENTAL POLICY

This chapter examines the historical forces that are conditioning, limiting, and institutionalizing the interdisciplinary science discourse into the contemporary science and technology, university and environmental policy discourses in Canada. The approach taken is genealogical (Dreyfus and Rabinow, 1983). The goal is not to write a detailed history of the project and its societal context. Rather, the objective is to map descriptively the terrain of the PECOS project as an historically emergent process in the on going process of historical events that are shaping university research and academic practice in contemporary society. The genealogy that is produced here draws on Foucault's notion of genealogy. However, it is not a Foucaultian genealogy in the sense of an interpretive analytic (Ibid). The procedure is to move from a macro-level and selective historical overview of Canada's national science and technology policy discourse to a micro-level examination of the PECOS conceptual framework for integrating disciplinary and community expertise into a system of interdisciplinary science oriented to the formation of environmental policy. Included in the overview is a selective examination of the historical forces that have shaped the national character of Canada's university system as well as those forces that have placed environmental policy decision-making high on Canada's public policy agenda. The genealogy draws on selected secondary literature as well as observations and documentary evidence that

were collected during the field research component of the PECOS case study. The genealogical investigation of the PECOS project is undertaken to make visible the macro-level social and cultural forces that frame the discursive learning processes that are investigated in Chapters Five and Six.

4.1. Institutionalizing the Science-Policy-Politics Discourse in Canada

Mannheim's (1936) prediction of a gradual rapprochement between science and politics appears to be the empirical reality in Western industrialized nations. One indicator of the trend in Canada has been a recurring thematization of the need to rationalize Canada's inter-sectoral science and technology effort (Brassard, 1996). Justifications for rationalization are typically formulated in terms of a need to enhance the economic competitiveness of the nation and an interest in facilitating more transparent and democratic forms of governance. In the new science and technology policy discourse, the historical trend is being formulated in terms of an explicit need to integrate university research into a "national system of innovation" (Industry Canada, 1997). While the discourse of constituting an integrated system of science and technology is being advanced as a new and innovative response to the emergence of a knowledge-based economy, efforts to harness university research to national interests are not a new phenomenon in Canadian history. There appears to have been a gradual change in emphasis, however, from promoting relations between science and government as a means to realize the goals of national policy, to an explicit interest in integrating scientific knowledge into the political policy process. In the current context this shift in emphasis is apparent in the emergence of a compelling rhetoric that emphasizes the need to ground policy and planning in the best scientific evidence that is

available.

Doern (1972) provided an early basis of empirical support for this claim with his examination of the interaction of science, politics, and government in Canada from pre-World War I up to 1970. Producing a chronological reconstruction of the emergence of the basic structures for science and technology policy during the period, Doern (1972: 1) argues that while relations between science and government have an extended history in Canada, the emergence of relations between science and politics is a force that has been gaining momentum since the 1960s:

> The science and government relationships were essentially those that developed between scientists and the federal bureaucracy via a growing network of granting agencies and governmental laboratories. Wider "political" processes were involved only marginally and intermittently. The science and politics relationships which are central to the present...involve the determination of broad social priorities and affect the central structures of policy-making. They influence the Canadian scientific community in such a way that the latter must now act politically, as a group, rather than as atomized individuals, merely receiving grants from the bureaucratic patron. Finally, they include the broad problem of communication among scientist experts, generalist politicians, and the scientifically uneducated general public.

Doern defends his thesis with a critical analysis of developments that led up to the situation he saw emerging at the end of the 1960's. Highlighted in Doern's analysis are a number of factors that help to place recent attempts to formulate a national science and technology policy into a broader contextual framework.

Doern's account of the extended history of mission-oriented research in Canada indicates that Canada's science and technology effort is largely an endowment of the natural resource economy that has shaped the development of the Canadian nation for

much of its history. Doern traces this relationship back to the mid 1800s. For example, in 1842 the Geological Survey was created to contribute to economic development by participating in the location of mineral, forest and water resources. In the agricultural sector, The Dominion Experimental Farms was an initiative that emerged in 1886 and by the time of the creation of the National Research Council (NRC) in 1917, the Department of Agriculture had established an extended network of institutes, stations and laboratories. While the vast majority of these early initiatives were explicitly oriented to industry and interests associated with economic development, one notable exception was the creation of the Canadian Conservation Commission in 1909 which was explicitly mandated to provide scientific advice to the government in matters related to conservation and resource utilization. Its overall use as a scientific advisory body to government policy was relatively limited, however, and by 1921 it had been dismantled (Ibid). Given Doern's analysis, early relations between government and science were oriented to creating the conditions for scientific research in targeted areas that would facilitate the exploitation of products of scientific research for the realization of pre-existing government policy. With the exception of the Canadian Conservation Commission, the science component in the relationship was viewed as a means to realize the goals of policy, and not as a component in the process of establishing or formulating governmental policy.

The expansion of science and technology in the pre-World War I period in Canada was slow and cautious. Further, the inter-sectoral coordination of science and technology during this period did not appear to be a priority for either industry or government. The coordination that did occur was largely a consequence of relatively

informal collaborations and exchanges among members of the scientific community who were working within industry, government, and university sectors of the scientific community (Langford, Langford and Burch, 1997).

The creation of the NRC in 1917 has been identified as an explicit response to military needs and interests of the nation, and is described by Doern as an initial attempt to rationalize Canada's science and technology effort. Following World War I, this effort was extended when the NRC was assigned the role of "honorary advisory council" to the federal government. Specifically, the NRC was mandated to assist the federal government with the development of policy for science programs oriented to promoting science and technology transfer to industry. The political advisory function of the NRC, however, was relatively limited and domain specific. It was also a role that was relatively short lived. The reasons for this were twofold. On the one hand, the NRC's limited power in political circles contributed to its development as more of a performer of research, than as an advisor on science policy. As a research performer, it tended to ally itself increasingly with the university science sector. With the onset of World War II, the secondment of the NRC for military interests significantly reduced its capacity to function in any role other than a performer of research.

In the post-World War II era, relative economic prosperity fostered a national science and technology coordinating mechanism of "big" bucks for "big" science. The result of increased investment in big science was a rapid expansion and growth across all science sectors. Notably, the rapid expansion did not engender an explicit interest in formulating and implementing a central science and technology policy. In 1963, the Glassco Commission on government organization drew attention to problems of

expansion without adequate coordination and to the related problem of insufficient investment in research and development (Doern, 1971). A proliferation of quasi-coordinating bodies followed with no clear indication of who was responsible for the overall coordination of science in Canada. In 1970, the Senate Special Committee on Science Policy concluded that no one was (Ibid). This lack of coordination was attributed to two primary factors. Firstly, relative economic prosperity had kept the issue of coordinating science low on the state's agenda. Secondly, dramatic expansion across all science sectors, and within the university sector in particular, had enhanced the organizational power of members of the scientific community. Within the university sector, members of the academic scientific community were able to mobilize the dual forces of the value of autonomous science and university self governance to explicitly resist any coordination of science that extended beyond the internal criteria of science, and the value of scientific knowledge as public knowledge.

Since the end of the Cold War, in the late 1980s, the relatively unplanned growth of science and the expanding power of science and technology in society have attracted the attention of critics at both ends of the political spectrum. On the political right there is increased emphasis on the need to put science and technology to work for the nation and industry in response to forces of globalization and the transition to a knowledge-based economy. These arguments stress the functional and instrumental benefits of science and technology for society and society's decreased capacity to continue to provide the capital and human resources required to sustain the traditional model of curiosity-based science (Simpson and Craig, 1997). On the political left, the negative effects of the scientific and technological transformation of natural and social

environments have emerged as a central focus. In these arguments, attention is being drawn to the real and potential threats that scientific and technological knowledge pose to humanity (Fisher, 1990; Irwin, 1996; Wynne and Irwin, 1998). Images of the Holocaust, the destructive power of nuclear energy, the uncertainties of bio-technologies and increased evidence of environmental degradation provide powerful symbols of the negative consequences of a blind faith in the progressive capacity of science and technology.

Given these dual developments, Doern's identification of emergent relations between science and politics in the 1960s appears to be developing in two directions simultaneously. Consistent with Doern's argument, the federal government's interest in drawing the scientific community into closer relations with politics in an advisory capacity has been an enduring theme since the 1970s. Moreover, it is an explicit and predominant theme in Canada's new science and technology discourse:

> The immense power of modern science and technology provides the capacity to inform policy and decision-making to an unprecedented extent. Moreover, the range of issues upon which governments look to science for advice is expanding. Science and technology not only inform governments on issues relating to the security and safety of both people and the environment, but are also key to policy development to strengthen the economy (e.g., innovation policy) and define better approaches to delivering government services (e.g., efficiency gains)....To strengthen the science-policy interface, the government must have access to the highest quality scientific information on which to base its decisions. The federal government's support for research in universities helps to ensure a strong base for scientific knowledge in Canada. (Industry Canada, 1997: 48-49)

At the same time that government is looking to the science sector to develop and

legitimate policy, science has increasingly become a political issue in the public domain (Berglund, 1998). Kazancigil (1998: 74) has summarized the current ironies of science, politics, and governance as follows:

> The credit that scientific expertise used to enjoy suffers, not only from the challenges of growing complexity, uncertainty and the risks brought about by social, economic and technological transformations, but also from the disappointment of decision-makers by the experts' inability to provide advice which reduces the range of risks and uncertainties, as well as by the public's realization that scientific expertise does not simply consist in enlightening and guiding policy-making by 'scientific truth', but that it is intimately linked to policy -makers by previously unacknowledged relations. Thus, the loss of credibility of scientific expertise appears to be yet another factor which further weakens the trust in governance, which relies frequently on experts, ...

A further discussion of this latter development in the sphere of environmental policies and politics is provided below. Prior to that, attention is turned to an examination of the development and transformation of Canada's university system in order to provide additional contextual detail for comprehending the history of endorsements for a particular interest in interdisciplinary practice in the present.

4.2. Integrating Canada's Decentralized University Sector into a National System of Innovation

The university sector in Canada is a symbol of the modernization of Canadian society. The concern at present is that universities are both the target and the means of processes of societal rationalization. There is also a growing concern that the decentralized and relatively autonomous character of Canada's university sector science is being displaced by the creation of "local/regional networks of invention and

innovation" (Doern and Sharaput, 2000: 178).

As noted in Chapter One, the majority of Canada's universities originated as small denominational colleges (Jameson and Pederson, 1997; Newson and Buchbinder, 1988). These colleges underwent a gradual process of secularization as they were integrated into society as publicly funded institutions. The expansion of programming into the arts and humanities, mathematics and physical sciences, as well as professional training in areas such as law, commerce, education and the health, engineering and agricultural sciences was a phenomenon that accompanied public investment and secularization. Overall, the pace and direction of these transformations in particular colleges and universities throughout Canada have tended to reflect the culture, economy, and politics of their times, and their region (Jameson and Pedersen, 1997).

From a national perspective, Canada's university system is characterized by decentralization and significant sub-national autonomy at the level of individual institutions. A primary reason for this is that Canada's constitution assigns jurisdiction over post-secondary education to the provinces. In the broader context, however, the universities are a shared federal-provincial responsibility. Historically, federal participation in provincial universities has occurred mainly in the form of transfer payments to provinces, research and development grants to institutions and faculty, and student loan and scholarship programs. In the area of research and scholarship within the university system, the federal government has traditionally been the major source of support. Historically, the federal granting councils and the NRC have operated as the primary sources of support for researcher-initiated study in the basic or pure areas of science and scholarship. In the area of mission oriented or applied research undertaken

within the university system, research funds have entered the university from the federal granting councils and from a variety of government departments and government sponsored initiatives. Throughout their history as public institutions, Canadian universities have benefited from relatively high levels of fiscal support and respect for their research and educational functions and values, from both, political and social publics (Ibid., 1997).

In Chapter One it was pointed out that the 1960s was a decade of major growth and expansion within Canada's university system. Newson and Buchbinder (1988: 12-13) have attributed the success and transformation of the university system during this period to a convergence of ideological, political, economic, and social forces that were supportive of the anticipated social benefits of university research and education:

> ...during this period, a broadly based public consensus was forged not on the objectives but on the benefits of higher education to society as a whole. Some viewed the benefit as being support for burgeoning industrial growth...liberal constituencies believed that increased educational opportunities and the resulting ease of mobility were social goods in themselves. Academics looked forward to a number of benefits: enhanced status, improved career opportunities and material rewards, and the ability to develop their own disciplines.

These general forces were also influential in the types of changes that were introduced and institutionalized into the university system during the period. For example, the hegemony of a liberal vision tended to promote and foster expansion in a direction that valued diversity and choice within universities, and encouraged the expanded participation of groups who had been traditionally excluded from the academic community (Ibid.). The academic community was also able to use the period of growth

and expansion to pursue its professional, associational, and organizational interests in a variety of areas within particular universities, and within the university system more generally. Increased expectations on the part of groups, both inside and outside of the university, were one of the implications of the expansion and growth that was experienced during this period.

Since the 1970s, the liberal vision of unlimited growth has given way to a climate of fiscal austerity and an increased interest in dismantling the social welfare system that was constructed in the post World War II era. The federal and provincial governments' emphasis on debt and deficit reduction during the 1980s and 1990s has impacted significantly on both provincial and federal support for university research and education. As described by the Association of Universities and Colleges of Canada (AUCC) (1996: 2), "Canadian universities are evolving from being publicly-funded institutions to being public-assisted". In the area of research and development, the federal government has shifted its policies and priorities in directions that are having a significant impact on the culture and social organization of research and development within the university sector. According to AUCC (1996), the federal government research and development agenda for the 1990s was driven by the rise of a new knowledge based economy and society, globalization, and a sustained preoccupation with fiscal crisis. To balance the tension between a need for innovation and an interest in restraint, the federal government took steps during the period to: reduce its role as a funder and performer of research; establish new mechanisms and promote new partnerships; and shift its traditional measures of research and development from an emphasis on inputs, to an emphasis on outputs. The impacts of these changes on

university research and training have been varied and diverse.

As the federal government opted for a reduced role in research and development, the universities were confronted with significant cuts to the budgets of the three national funding councils, the Medical Research Council (MRC), the National Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC) (Ibid.). At the same time, the national funding councils developed strategic plans which allocated significant portions of their internal budgets to strategic and problem oriented research initiatives. Downward trends in the research funding available from alternative government departments and sources coincided with the cuts to the federal councils in the mid 1990s. Toward the end of the 1990s, the federal government reversed the funding trend with strategic investments in the NCE program, creation of the Canadian Foundation for Innovation (CFI) and massive increases to health research through the establishment of the Canadian Institutes of Health Research (CIHR).

The creation of new mechanisms to increase the federal government's capacity to steer the national science and technology effort is being driven by an interest in promoting knowledge transfer, redistributing the burden of federal-provincial support for national research and development, and increasing private sector involvement and investment in research and development. The language of the new steering mechanisms is increasingly partnerships, collaborations, networks, strategic initiatives, alliances, knowledge transfer, and knowledge commercialization. Coinciding with the new language is the government's increased focus on outputs and outcomes as measures of the value of its investments in research and development across the science sectors.

The new steering language has also become a part of the general milieu of the universities as indicated in the expansion of administrative systems, a growing emphasis on the need for information systems, technology transfer and research commercialization departments, and the implementation of evaluation systems to track the impact and output of universities in society.

The roles, responsibilities, and expectations of universities and university sector science are changing. However, considerable uncertainty exists over the direction and implications of these changes for the university, and for society. As pointed out in the *McKay Report on Universities* (1995) in Saskatchewan:

> In a society of rapid institutional change, publics also grow concerned that universities (whose culture, tradition and governance structures have historically permitted change only incrementally and slowly) may not be adapting fast enough in a world in which radical and immediate change, political, economic and social, is evident at every hand. In the result there are demands for greater university accountability in the spending of public monies and, in direct response, university communities are quick to defend traditional values of university autonomy and freedom. The critics, in turn, argue that those latter defenses are sometimes thinly veiled disguises to protect the status quo ante, to deny necessary change, and to serve personal goals of university faculty and administrators....The public debate on many of these broad issues is at an early stage. There is little consensus as to the impact and significance of each of these factors and there certainly is no consensus as to the specific responses which universities should make in such an environment.

At the outset of this section it was suggested that universities in Canada have been traditionally viewed as a symbol of the modernization of the nation, and of particular regions. In the contemporary context, there is a growing concern that universities are becoming both a target and a means for the extension of processes of

rationalization. Several of the indicators of these latter trends that have been identified in the discussion suggest that the current emphasis on rationalization is understood as a process that will enhance the accountability, effectiveness, efficiency and relevance of universities in society. As pointed out in McKay's report, the contemporary historical conditions are giving rise to an increased concern that the accountability discourses pose an explicit threat to the freedom and autonomy that universities and their faculties have claimed as a normative foundation for the pursuit of knowledge that serves common interests. In this debate, the interaction between accountability and autonomy is being constructed as an expression of competing interests between universities and society. Because many of the conditions that are being identified to justify the need for increased accountability and relevance are common concerns, the university appears to be confronted with a situation in which it has little choice but to compromise on its traditional claim to freedom and autonomy. Should the university refuse to acknowledge these common concerns, it risks portraying itself as self-interested and in violation of the validity claim that grounds its normative claim to freedom and autonomy. These issues are particularly salient in the domain of contemporary environmental problems:

4.3. Constructing Canada's Science-based Environmental Policy Agenda within a Paradigm of Sustainable Development

Environmental issues entered the domain of legitimate public political concern in the early 1970s (Alario, 1994). In the decades leading up to 1990, the environmental discourse in Canada and elsewhere succeeded in creating a political counter-force to the prevailing paradigm of liberal economic growth (Stoesz, Guzzetta and Lusk, 1999).

One pivitol event during the period was the publication by the United Nations Brundtland Commission's (1987) report, *Our Common Future.* The concept of sustainable development that was advanced in the report captured the attention and interest of nation-states, the corporate community, the scientific community, environmental lobbyists, and members of the general public (Adkins, 1992; Doern and Conway, 1994). Part of the widespread appeal of sustainable development as a new paradigm for planning and policy development was its "constructive ambiguity" (Doern and Conway, 1994).

As defined by the Brundtland Commission (1987), sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In contrast to the reactive standpoint of liberal economic approaches to environmental policy decision-making, the concept of sustainable development encourages a pro-active standpoint on environmental issues. Specifically, it emphasizes the need to develop policy decision-making processes that have the capacity to prevent environmental degradation and thereby reduce the need for reactive responses.

Unlike the unlimited expansionist ideology of the liberal economic growth paradigm and the anti-expansionist implications of a limits to growth paradigm, the paradigm of sustainable development advances an interest in reconciling the need for economic expansion within an overall framework of responsible environmental management. The primary means to achieve this goal are technological innovation and promoting a principle of individual stewardship. One of the primary attractions of policy decision-making within a paradigm of sustainable development is its capacity to

include both monetary and non-monetary aspects of economic welfare. A second attraction of the paradigm is its orientation to the realization of general interests as opposed to the particular interests of nations, governments, business, and individuals. Thirdly, a sustainable development paradigm is explicitly oriented to the inclusion of environmental considerations into the development of economic policy. Given these general characteristics, the paradigm of sustainable development is widely considered to have the capacity to appeal to diverse and competing interests.

Skogstad (1996), Hoberg (1993), Paehlke (1992) and Lucas (1989) identify the mid-1980s as marking a division between two generations of environmental policy decision-making in Canada. Depending upon the source, this division has been drawn in terms of overall shifts in government policy objectives (Lucas, 1989), changes in the interests, institutions, and ideas informing environmental policy decision-making (Skogstad, 1996; Hoberg, 1993), and changes in the tone, character, and interests of the environmental movement (Paehlke, 1992). According to Skogstad (1996), the first generation of environmental policy decision-making in Canada extended from the early 1970s to the mid 1980s. During this period, environmental policy in Canada was significantly influenced by the federal-provincial jurisdictional division of powers that has characterized policy decision-making in Canada more generally. Specifically, environmental policy during this period was characterized by considerable jurisdictional ambiguity as to which level of government was responsible for environmental matters, a normative consensus that tended to prioritize economic interests over environmental regulation, and relatively well established mechanisms to enable consultation and negotiation between provincial and federal levels of government (Ibid). The overall

effect was to:

> ...create an environmental policy framework wherein the government of Canada took the lead role in proposing national guidelines and objectives, regulatory standards were established through a process of intergovernmental consultation and bargaining that gave a preferential role to locally dominant economic interests, and the resulting pollution control regulations were then enforced by provincial governments (Ibid: 106).

Doern and Conway (1994: 12-15) have produced a model of Canada's federal environmental policy effort since the 1970s that is partitioned into three relatively distinct phases. They cast these three phases in terms of the rise, fall and rise of the Department of Environment (DOE) "in public profile, sense of achievement and political interest" between 1970 and 1990 (Ibid.: 12). The first phase, extending from 1971 to the middle of the 1970s, is described as a period of expansion, enthusiasm, political leadership, and stability within the DOE (Ibid.). The overall orientation to environmental problems during the first phase was reactive:

> Political realities meant that the emphasis had to be on reactive environmental measures and on creating a basic regulatory infrastructure. This was not the time for preventative or anticipatory action. There was too much catching-up to do to redress the sins of past unthinking industrialization (Ibid.)

The second phase, extending from 1975 to 1985, is depicted by Doern and Conway as a period of relative inactivity. The authors attribute this inactivity to national economic instability, inconsistent political leadership, and budgetary cutbacks that significantly reduced the "regulatory, technical, and service capacities of the DOE" (Ibid: 13). The third phase, beginning in 1986 and extending into the 1990s, is described by Doern and

Conway as a period of resurrection for the DOE that coincided with a rejuvenated interest in environmental issues within the public political domain. The tabling of the federal government and DOE Green Plan in December 1990 is identified as a pinnacle achievement of the third phase. One of the central features of Canada's Green Plan was an explicit interest to integrate university sector science and training into the process of identifying and developing technological and policy solutions to environmental issues. This interest was justified in terms of the need to ground environmental policy and decision-making in the best available scientific knowledge and evidence concerning the status and condition of Canada's environment.

4.4. Canada's Green Plan and The Tri-Council Eco-Research Program

Johnson (1995) describes *Canada's Green Plan for a Healthy Environment* (1990) as a product of both principles and politics. The principles that motivated the Government of Canada and the DOE to initiate the process leading up to Canada's Green Plan were derived from the concept of sustainable development that had been advanced by the Brundtland Commission. Political motivation for Canada's Green Plan arose during the 1988 federal election campaign when public opinion polls identified environmental degradation as a significant public concern, and a factor that warranted consideration alongside economic factors in policy decision-making processes. Responding to public concerns about environmental degradation was moved high on the agenda of Prime Minister Brian Mulroney's campaign for the re-election of his conservative government (Ibid.). When elected for a second term, the Mulroney government proceeded to act on the election promises.

Using the Brundtland Report as a conceptual framework, Canada's green plan

articulated a statement of purpose for addressing environmental issues in the Canadian context, and an action plan for transforming these principles into a reality (Canada, 1990: 5):

> While Canadians accept the merits of sustainable development, we understand it is a philosophy, not an action plan. Canadians themselves must determine their own actions for harmonizing our environment and our economy. The Green Plan sets out how we are going to achieve it together in the years to come.
>
> The Green Plan is not the solution to all our environmental problems. There is no simple solution to the problems we face. No single person, group or level of government has all the answers.
>
> The Green Plan recognizes that, while governments have responsibility to provide leadership, only society as a whole can produce the changes we need to meet the economic and environmental challenges of the 1990s and beyond. This is a national challenge requiring the individual and collective efforts of all Canadians. It will require changes in our thinking and our actions.
>
> It is a plan based on assumptions about the world, the economy and the priorities of Canadians. Like any plan, it was developed knowing that conditions and priorities will change, and new information will alter our assumptions. The Green Plan is designed to change too.

The plan identified five principles to guide environmental action. These included respect for nature, acknowledging the necessary interaction of economy and environment, valuing the efficient use of resources, sharing responsibility, and practicing informed decision-making. Encompassed under the principle of informed decision-making was recognition of the need to foster more and better science as a foundation and guide for policy level decision-making in the environmental domain.

This need was to be realized across government, industrial, and university science sectors. Strategies to enhance the availability of scientific knowledge and technology for policy level decision-making included the revitalization of government research facilities and the creation of taxation and financial incentives for private sector investments in industrial research and development in the area of the environment. The primary mechanism for integrating university sector science into the environmental policy decision-making process was the creation of the Tri-Council Eco-Research Program. The Tri-Council brought together the three major science granting councils, MRC, NSERC and SSHRC.

The federal government's budgetary allocation to the Green Plan Program was 3 billion dollars distributed over a five year period. This allocation was to be made in addition to the Government of Canada's annual budgetary allocation of 1.3 billion for the environment. Within the Green Plan Program, funding for the Tri-Council Eco-Research Program was targeted at 40 million dollars, to be distributed over six years between 1991 and 1997. Within the Tri-Council Eco-Research Program this funding allocation was distributed among Eco-System Research Grants, University Research Chairs, and Doctoral Fellowships in the field of environmental sciences. In the February 1991 budget the new money for the plan was reduced by $600 million and a comparable reduction was repeated in 1992 (Doern and Conway, 1994). When the Liberals were voted into government in 1995, the Tri-Council Eco-Research Program was reduced from $11 million to $1 million (AUCC, 1996).

A central objective of the Tri-Council Eco-Research Program was "to support cross-disciplinary research that integrates the disciplines of the social sciences and the

humanities, the natural sciences and engineering, and the health sciences" (Eco-Research Tri-Council Secretariat, 1995: i). The SSHRC, MRC, and NSERC were responsible for the administration of the program. The Tri-Council Eco-Research Secretariat was provided with a structural location in the SSHRC.

The Eco-Research Program decision-making structure was comprised of three inter-related committees. The presidents of SSHRC, NSERC, and the MRC constituted the Tri-Council Management Committee. The president of SSHRC acted as chair for this committee for the duration of the program. As an executive body, the Tri-Council Management Committee assumed overall authority and responsibility for managing the Eco-Research Program. The primary tasks included policy level decision-making authority within the framework of the objectives of the program, and reporting directly to the Minister of the Environment. The Director, Science Policy Branch of Environment Canada sat as an observer on the management committee, providing an additional channel of communication to Environment Canada. The Directors General of SSHRC, NSERC and MRC made up the Tri-Council Operations committee, assuming responsibility for the coordination and operation of the program. This committee reported to the Management Committee and served as an advisory body relating to matters of program policy. An independent Peer Review Committee assessed all applications for research grants, development grants, chairs, and fellowships. The committee included representation from the social sciences, humanities, health sciences, natural sciences, engineering and representatives from the policy sector. The Tri-Council Eco-Research Secretariat was responsible for the day to day operations of the program and the MRC was assigned responsibility for the

program evaluation component. Given the structural organization of the Tri-Council Eco-Research Program, it was constituted as a program of mission oriented research which was accountable to government, but was to operate as a program of autonomous research protected within the constitutional autonomy of the federal granting councils. As a mission oriented research program that was oriented to addressing the public's common concern for the environment, and that was to operate at arms length from the government, the Tri-Council Eco-Research Program was a program that carried considerable appeal among scientists working within the university sector.

4.4.1. The Distribution of Eco-Research Program Research Grants among Canadian Universities

Between March 1993 and February 1994, a total of ten Eco-Research Program grants were awarded to university based researchers and their partners in public and private organizations across Canada. Four of the principal investigators were located at universities in Ontario, three in Quebec, and the three remaining grants were awarded to principal investigators located at universities in Newfoundland, British Columbia and Saskatchewan. The total monies awarded for research projects across the ten projects was approximately 18.5 million dollars. The PECOS Project grant application was submitted to the Tri-Council Eco-Research Program in October, 1993. PECOS received notification of award in April, 1994.

The vast majority of the projects funded through the Tri-Council Eco-Research Program were clearly driven by the environmental science interests of the physical, health, and engineering sciences. The interests of the social sciences, humanities, and residents of local communities were included in many of these projects as an after

thought, if they were included at all. There were two notable exceptions. At Memorial University, the *Sustainability in a Changing Cold Ocean Costal Environment* Project adopted a critical social policy approach to its study of Canada's cold ocean coastal environment sustainability, arguing that the issue of sustainability is a policy issue and not simply a problem of environmental science or conservation. The second exception was the PECOS Project for *The Sustainability of the Semi-Arid Prairie Eco-System* which proposed to integrate community participation as a central component in its interdisciplinary framework for the study of the prairie ecosystem.

4.4.2. Formulating an Integrated Research System for PECOS

The PECOS Project research proposal was the product of approximately two years of collaborative planning among research faculty at the University of Saskatchewan and the University of Regina. The research faculty who had participated in this process, and who were responsible for the proposal that was submitted to the Tri-Council Eco-Research Program were participants by virtue of a process of self-selection. Reminiscing on the events that had led to the submission of the grant proposal to the Tri-Council Eco-Research Program, one of the principal investigators depicted those events as follows:

> ...remember what happened two years ago. A general call went out from this campus [University of Saskatchewan]. And then the call went out to the campus researchers saying "here's this limited sum of money to do this. What can be done about it?" That's how it started. The next phase was one in which both campuses pulled together x number of specific, discrete and certain projects with certain ambitions. A project was proposed that reflected the reality and we got half [PECOS Management Committee Meeting, May, 1994].

The comments of another principal investigator indicated that the process of collaboration had been an intense one; the product of working out sustained disagreement and difference of perspective and not simply the reaffirmation of a pre-existing consensus grounded in the interests of the scientific or university communities:

> ...I think this is how base things have to be...because I'm, you know, our focus group has been gnashing around at reviewers and around this committee many times over the last two years. But I just want to say on tape here, that uhm, ...I really admit that the linkages across the three foci are not strong. But I do think that our little gang ...is probably the best model of interdisciplinary research in this model...we've been working from a bottom up perspective. Everything I bring to the committee here is not reflecting my opinion, but the group's and ahmm...I haven't seen that in the other groups. I've seen a lot of top down...So I just, but our little group I think....[PECOS Management Committee Meeting, May, 1994].

Given that participation in the process had been voluntary and that it had involved intense disagreement and difference of perspective, it must be presumed that the research faculty who continued to participate in the project were there because they were genuinely interested and motivated to participate in the type of interdisciplinary and community based research program that had been proposed for PECOS.

The PECOS project was proposed as a three year study "to evaluate the sustainability of the semi-arid prairie ecosystem in terms of the health of the land and the well-being of the people" (PECOS, 1993). The specific objectives set out in the proposal were: " (1) to conduct an integrated research program to examine the historical and contemporary practices and patterns of land use; (2) to explore ways of achieving a sustainable ecosystem; (3) to develop processes and a team for conducting

the relevant research that is both interdisciplinary and community-based; and (4) to provide postgraduate training in an interdisciplinary mode" (Ibid.: 4). It was designed as an interdisciplinary, inter-university, inter-sectoral and community based study that would produce scientific, technical, and practical outcomes relevant to the sustainablity of the prairie ecosystem.

Like the vast majority of the Tri-Council Eco-Research Program projects, PECOS was grounded in a conceptual framework of systems rationality. As stated in the original proposal:

> ...three distinct, but interrelated, foci are defined that reflect the social, health, and physical and biological sciences respectively, in a shared general systems structure. In any ecosystem, there are subsystems which are both parallel and hierarchical in their interrelationships. Each subsystem has a set of inputs, a set of internal processes, and a set of outputs. Usually there is a set of feed-back loops as well, along with a set of regulatory signals from outside the subsystem, and a set of regulatory signals exiting from the subsystem. Energy, material, and information flow into, through, and out of, each subsystem (PECOS, 1993).

In addition, the general systems framework was to establish a basis for integrating "top quality science" with the "cultural knowledge, wisdom and skills" of the people residing in the study region.

An interim Management Committee comprised of nine co-principal investigators specialized in soil science, sociology and rural sociology, agricultural economics and cooperatives, eco-toxicology, environmental geochemistry, conservation biology, health and environmental epidemiology and plant ecology was constituted to oversee the project in its developmental phase. In the event that the research proposal

was successful, the interim Management Committee was to become the PECOS Management Committee and assume overall responsibility for the direction of the project in its operational phase. The principles that were to guide the PECOS Management Committee in the process were their interest in, and commitment to facilitating the interdisciplinary and community based standards of the project as a means to achieve the theoretical, empirical, and practical goals of the research project and of the Tri-Council Eco-Research Program.

4.5. Summary

This chapter delineated the historical and situational context of the PECOS Project. Its overall purpose was to provide a descriptive overview of the terrain of the PECOS Project as an historically emergent process. This objective was accomplished by adapting Foucault's genealogical strategy to an examination of the historical forces that are conditioning, limiting, and institutionalizing the interdisciplinary science discourse into the contemporary science and technology, university, and environmental policy discourses in Canada. The investigation moved from a macro-level historical examination of the interaction of science, government, and politics in the Canadian context to a micro-level description of the PECOS Project proposal for practicing interdisciplinary and policy relevant research within the contemporary university sector. The genealogical reconstruction of these various discourses identified a number of themes that are shaping, and being shaped by, the interaction of forces of accountability and autonomy in contemporary academic practice.

At the level of Canada's national science and technology discourse, the need to rationalize Canada's inter-sectoral science effort is a prominent theme. This theme

is embedded in a compelling rhetoric of realizing common interests in establishing and sustaining a high quality of life for all citizens. It is also imbricated with a compelling rhetoric of the need to promote citizen participation in a process of democratic governance that is transparent and informed. In this discourse, the university and its academic constituents are being called upon to demonstrate their accountability to the public and realize their normative and constitutional commitment to serve common interests by participating in forms of scientific research that are problem oriented, interdisciplinary, and policy relevant. The university's traditional claim to the need to preserve academic freedom and autonomy as a means to realize its normative commitment to serve the common interest is being reconstructed and undermined in this discourse as a means to strategically defend and pursue the self interests of the university and its constituents. The implications of the contemporary situation for the rationality of university reason in society and the rational autonomy of academics within the university sector are questions that have moved to the centre of the discourse.

The next chapter shifts the discussion from a macro-level historical overview of the PECOS situation, to a micro-level investigation of the process and procedure of interdisciplinary science within the university. It focuses on the actual practices that shaped, and were shaped by the forms of rationality that emerged in the constitution and regulation of interdisciplinary research in the PECOS case that was studied in this research.

CHAPTER FIVE
FROM KNOW WHAT TO KNOW HOW: PECOS PRACTICES

This chapter investigates the social rational character of the intersubjective world of the PECOS Project. It focuses on a selection of micro-level social interactions that emerged in the social context of PECOS Management Committee meetings. In Chapter Two it was argued that within the framework of a theory of communicative action, the rational character of social action is understood to arise out of a fundamental presupposition that subjects must adopt if they are motivated to engage in communicative action as a means to coordinate social action. Within Habermas' theory of communicative action, rational social action is understood to arise out of a common human interest to realize a rational consensus through achieving mutual understanding on defeasible validity claims. The arguments justifying the adoption of this framework for the analysis of data generated in the PECOS case study were articulated in Chapter Two. In this chapter, the categorical framework of the theory of communicative action is drawn on to enable a reconstruction of the forms of rationality that emerged in, and regulated social action within the context of PECOS Management Committee meetings. The chapter begins with a descriptive overview of the social structural conditions that framed the social interactions observed in the context of PECOS Management Committee meetings. It uses the methodology of the extended case study method to gain access to the forms of rationality that were expressed in the processes and

procedures that constituted and regulated the social interactions of the PECOS Management Committee. The chapter concludes with a theoretically informed reconstruction of a situation of exemplary communication among members of the PECOS Management Committee.[3] It was a situation wherein members of the PECOS Management Committee were observed to engage in a process of intersubjective interpretation oriented to realizing mutual understanding on contested validity claims relevant to the constitution and regulation of interdisciplinary inquiry and conduct within the university.

5.1. Selecting a Focus for Observing Rational Social Action: The Social Structural Conditions of the PECOS Management Committee

In his theory of communicative action, Habermas elaborates a theory of argumentation as a means to achieve mutual understanding on defeasible validity claims and realize a rational consensus in contexts of social action. One of the social structural features that is constitutive and regulative of argumentation oriented to mutual understanding is a general symmetry of social condition among the participants. Examination of the social structural conditions that had been proposed for internal communications among participants in the PECOS project indicated that the project had

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Exemplary is used in the dissertation to refer to practices that are considered worthy of imitation within the interpretive framework of a theory of communicative action. Use of the term is not intended to imply that the practices analyzed in the research were typical of the communication situations observed in the case study.

adopted a general asymmetry of condition for the intellectual direction and administration of the project. In describing the plans and mechanisms for facilitating internal communications among participants, it was asserted in the PECOS project proposal that the PECOS Management Committee was to be vested with "the mandate to direct the study". As director of the study, the Management Committee asserted that it would require "progress reports from the co-investigators" and would "withhold funds from those who [were] not making satisfactory progress, who fail[ed] to recruit appropriate students within a reasonable period, or who [did] not contribute to interdisciplinary goals." Although the adoption of a hierarchical structure for intellectual integration and project administration was made explicit, it was reasoned that a general symmetry of condition may be a feature within individual components within the project. Specifically, as the structural component responsible for the overall coordination of the project, it was anticipated that a general symmetry of social condition may be a constitutive and regulative feature of the social interactions of the PECOS Management Committee.

Preliminary examination of data that were being generated from field observations within various domains of the PECOS project indicated that the PECOS Management Committee meetings were a suitable site for investigating how the conceptual framework of the PECOS project was being translated into a reality through communicative practices among the research faculty. Two primary observations factored into the conclusion. Firstly, the PECOS Management Committee was observed to be a social setting within the project that had been constituted as a situation that approximated a situation of general symmetry. Secondly, the PECOS Management

Committee was observed to exhibit those features which approximated the conditions necessary to function in the capacity of a 'universal audience' for the PECOS project.

By virtue of its responsibility for overseeing, facilitating, and directing the development of the project over its life history, the PECOS Management Committee provided a vantage point from which to grasp a global understanding of the PECOS project at the micro-level of social interaction. Structurally, the PECOS Management Committee was constituted of individuals who exhibited characteristics that were both homogenous and heterogenous. For example, all of the original members of the PECOS Management Committee held a reasonably equivalent status within the project as co-principal investigators responsible for the research grant, and accountable to the Tri-Council Eco-Research Program as the funding agent for the project. For the most part, all of the co-principal investigators for the project were established and recognized intellectuals in their respective disciplines, as well as senior faculty within their respective colleges, units, departments and the university in general. Given these features, relative equity of position and status was observed to be a structural condition of the PECOS Management Committee in its developmental and operational phases.

Diversity was also observed to be a structural condition of the PECOS Management Committee. One aspect of diversity that was considered important for this study was the diversity of discipline and perspective that the research faculty brought to the committee. A summary of the diversity of disciplinary perspective within the PECOS Project is provided in Appendix III. Because the committee was responsible for the overall direction of the project it had been important to ensure that perspectives from all sub-components had a reasonable level of representation and voice at the

management level. Given a broad interpretation of the meaning of the concept of interdisciplinarity, the principle of ensuring a broad representation of the sub-components of the project meant that the management committee was one of the most structurally interdisciplinary components within the project. In its original constitution, the diversity of perspective within the PECOS Management Committee was primarily a diversity of disciplinary perspective within the value sphere of scientific knowledge. As the project developed over time, the membership of the management committee changed through the addition of members who represented other knowledge and value perspectives relevant to the project. Specifically, one member was added to represent the PECOS student body and two members were added to represent the perspectives of residents within the study area. With these additions, the representativeness of the PECOS Management Committee, as a universal audience within the project, was observed to evolve and expand over time.

In terms of process, the PECOS Management Committee was selected because each member on the committee embodied within them two interrelated, but potentially contentious, poles of need and interest relevant to the project. As co-principal investigators responsible for the project, members of the PECOS Management Committee had a vested interest in realizing the universal interests of the project. As participants in one or more of the sub-components of the project, individual members of the PECOS Management Committee had a vested interest in representing and voicing the particular interests of one or more of those sub-components on particular issues that were before the committee. As such, the members of the PECOS Management Committee were viewed as the embodiments of the dual qualities of accountability and

autonomy as these factors related to the PECOS project overall, its components and the various communities that the project was embedded in. Given the dual characteristics of homogeneity and heterogeneity that were constitutive of the PECOS Management Committee, it was reasoned that the PECOS Management Committee would be an appropriate point of focus for the micro-level analysis of the social interactions that were constituting and regulating the practice of interdisciplinary research within the PECOS project. As the analysis proceeded, extending out to an examination of data generated in other sites of the project provided a means to validate the themes and findings that were observed to be emerging at the level of social interactions within the PECOS Management Committee.

5.1.2. Sociability in the Social Interactions of the PECOS Management Committee

As indicated in Chapter Four, members of the original PECOS Management Committee had worked together as collaborators on the PECOS research proposal for approximately two years prior to receipt of funding for the development and operation of the project. University communities, although relatively large and diversified, are in many aspects similar to 'small', relatively enclosed communities. Consequently, there are varied and multiple opportunities for social interaction among the constituents of the university in their everyday practices. Given these general conditions, it was assumed from the outset that many of the individuals who constituted the PECOS Management Committee had some general familiarity with one another and may have been accustomed to working and associating with one another in areas that were unrelated to the PECOS Project. Consequently, several of the university research faculty who

constituted the membership of the committee would have had ample opportunity to form notions of each other's subjectivities, and to have developed consensual or conflictual relations with those subjectivites. Certainly, there were times over the duration of the field study when tensions arising from conflicting subjectivities were observed to emerge into the communication situations. Given the frequency and intensity of social interactions that were required in the project, and the substantive content of the issues that arose, it would have been remarkable if these kinds of tensions had not emerged into the social situation. When tensions between individuals emerged into the social situation, others would intervene to divert attention away from the tension, help to repair the situation, or take steps to defuse the situation. These kinds of subjectivities and intersubjectivites are not easily captured from either an observer or participant perspective. They are features of the social situation, however, that frequently provide the cement or the solvent in the social situation when contentious issues and relations emerge.

Overall, social interactions among members of the Management Committee were polite, collegial, professional, and amicable. All of the manners that would be expected and considered appropriate to the setting were consistently practiced. Additionally, many of the individuals seemed to have several outside interests in common. Hence, the group was one in which conversation on many levels and topics could, and did occur consistently over the duration of the project. Although these factors are not addressed directly in this study, it is important to acknowledge that they were there as features of the lifeworld of the group. Consequently they were resources which could be drawn on and brought into the situation when, and if needed.

5.2. The Two Worlds of the PECOS Management Committee: Social System and Public Sphere

As discussed in Chapter Four, the PECOS project had been conceptualized as a social system of research scientists oriented to seeking resolutions to a common problem. Observing the day to day practices of PECOS, it was apparent that the conception of the project as a social system had been internalized into the beliefs and practices of individual components within the system. Reference to "the system," "general systems theory," and "systems in general" was pervasive in PECOS. Because the overarching theme and focus of the project and program was the 'ecosystem,' the tendency for participants to use system concepts in their general discussions was not surprising. As observations proceeded, however, PECOS in general and the PECOS Management Committee in particular, did not always appear to behave as a social system. Rather, there were several indicators to suggest that PECOS was constituting itself, as well as conceiving and regulating itself, as a public sphere.

As pointed out in Chapter Two, Habermas (Seidman, 1989: 231) defines a public sphere as "a domain of our social life in which such a thing as public opinion can be formed, ...[it] is open in principle to all citizens...[and] is constituted in every conversation in which private persons come together to form a public." An early indication of the conception of PECOS as a public sphere was found in the project proposal where involvement of community members in planning and carrying out the research was set out as an explicit goal. As observations proceeded, the need to conceptualize, constitute and regulate the PECOS Project as a "public sphere" was thematized by several of the subjects who participated in discussions about how PECOS

was to realize the objectives that it had set out in the proposal. Indicators were manifest in discussions concerning the "need for community involvement," the means for involving members of the study area in the research process and the possibility of holding "town hall meetings" as a strategy for increasing community interest and participation in the project.

Structurally and motivationally, the PECOS Management Committee was observed to exhibit many of the features and qualities that are associated with the concept of an "ideal" public sphere. Firstly, the faculty who were interacting in the context of the PECOS Management Committee meetings were equals by virtue of their status as tenured faculty with their respective universities. Virtually no one in the group had any institutional authority to give directives, or to officially sanction anyone in the group for not complying with the will of the group. Secondly, all of the research faculty who were members of the PECOS Management Committee had demonstrated their interest in, and commitment to the project, by remaining involved in the process. It was concluded from this observation that all of the research faculty shared a common interest and a common goal. Thirdly, the research faculty who were participating in the management of the PECOS project were there of their own volition. As indicated in Chapter Four, participation in the PECOS project had come about through a process of invitation and self-selection. Participation was not the result of force, coercion or necessity, beyond the force of the contractual obligation that was established between principal investigators and the funding agent. A fourth feature of the PECOS Management Committee context that was seen to resemble the conditions of a public sphere was the fact that the members were not of a like mind. Rather, they were

individuals who were specialists in their respective disciplines and fields. They had come to the project as socialized and structurally positioned agents with different perspectives, different knowledges, different experiences, different interests, different needs, and different duties and obligations.

One interesting observation to emerge over the course of the field observations was that not only did the PECOS Management Committee exhibit the external features of a public sphere, several of the research faculty expressed subjective dispositions that were consistent with participation in a public sphere. Subjects would frequently mention in passing, and in more formal statements, that while the research faculty in the project were intellectual specialists in their own fields, relative to each other they occupied the same social space and social relation as any layperson would occupy relative to an expert. Similar kinds of comments were made about the interaction of "expert" knowledges of university researchers and "expert" local knowledges of persons living within the PECOS study area. Referring to the cultural wisdom and knowledge of the people in the study area, research faculty frequently described themselves as lay persons interacting with, and relating to, "the experts."

A final point of convergence between the situation of the PECOS project and the characteristics of a public sphere emerged from the mandate of the project. As part of the Tri-Council Eco-Research Program, PECOS was mandated to produce high quality scientific knowledge with implications for the development of public policy. In other words, the program and the project had been conceived as theory with practical intent. The goal was not simply to study the world for the purpose of knowing the world, but to study the world with the intent of changing it. Given the objective and subjective

conditions and qualities that were observed in and around PECOS, conceiving of the PECOS Management Committee as analogous to a public sphere did not seem out of order.

That PECOS had been conceptualized as a social system of researchers, yet was frequently behaving and operating as a public sphere of citizens, raised several interesting questions about what interdisciplinary inquiry and conduct means within the university setting. These observations suggested that there were indicators of an underlying tension in the project that was worthy of more detailed investigation. Specifically, the observation that PECOS was exhibiting the characteristics of a social system and a public sphere at the same time seemed to fit with Habermas' theoretical claim that society is usefully conceptualized as both a system and a lifeworld. Was PECOS constituting and regulating itself as the effect of interactions between the adoption of systems rationality and the practices of communicative rationality?

To pursue this hypothesis, attention was turned to an examination of what the research faculty were doing when they came together as a public. More specifically, questions were posed concerning how were they doing interdisciplinary science and whether they were doing it as individuals who were pursuing particular interests, or whether were they doing it together in the pursuit of a common interest? For example, were the "agendas" in the PECOS spaces pre-established and carried out as a means to realize predetermined goals, or were the goals and the means of PECOS being constituted in the situation, and regulated through processes of discursive will formation as the project developed? In other words, were the members of PECOS speaking to one another and thereby constituting monological social relations or were they speaking

with one another and constituting dialogical social relations? To this point in the analysis, the data had been "analyzed" at a global level, and more or less impressionistically. At this stage in the study, a concern arose as to whether the literature was determining what was being observed in the field, or whether the observations were informing a critical evaluation of the theoretical generalizations available in the literature. To address the problem of an interactive bias between the literature and the data, attention was turned to a more systematic investigation of the data that were being generated from the field observations. As a first step in the process, the transcripts of PECOS Management Committee meetings were systematically interrogated for "themes in general" and "themes of interdisciplinary science" in particular. One of the objectives that guided this task was an interest in identifying any anomalies that were emerging between the observations in the field study and the claims advanced at the level of critical social theory.

5.3. Elaborating the Three Worlds of Interdisciplinary Science

When transcripts of PECOS Management Committee meetings were systematically investigated for themes of interdisciplinary science, three categories of the concept of interdisciplinary science were found to emerge from the conversations and deliberations that were taking place within the group. Two of these categories emerged directly from the comments about interdisciplinarity that were advanced by individuals who were participating in the discussions. The third category was constructed by abstracting from the content of the discussions that were taking place and reflecting on what the individuals were doing, when they were talking about doing interdisciplinarity, and when they were doing interdisciplinarity.

Discussions about interdisciplinary science were a common practice in the early phases of the PECOS project. For example, during the first PECOS Management Committee meeting that was attended as part of the field component of this study, the problem of interdisciplinary science was explicitly thematized and introduced into the meeting as the focus of a relatively lengthy discussion among the participants. The comment that initiated the discussion was a query from one of the co-principal investigators, a senior professor in biology, as to precisely what it was that they were proposing to do:

> Has anyone ever done this before? I mean this is all very new to me, but I mean we've heard a lot about interdisciplinary research but I've never really seen any. It goes beyond, I mean I've seen within certain defined areas, but this goes beyond. I mean, has it ever been done? This is what I'm concerned about. Do we have a model to look at or something? ...one thing that's occurred to me in trying to think about this, but it's what I have normally done when I've had a thing to go about, what kind of report are we thinking of turning in at the end? ....kind of an architectural framework of what we're building for...[Example 5.1. PECOS Management Committee Meeting, May, 1994]

In the conversation that followed, several of the co-principal investigators voiced their subjective conceptions, experiences, and evaluations about the nature, meaning and purpose of interdisciplinary inquiry. The absence of a pre-existing consensus on the meaning and practice of interdisciplinary science among the co-principal investigators of the PECOS Management Committee was apparent in the varied and competing validity claims expressed by the different speakers. The standpoint of one of the co-principal investigators from the health sciences was articulated as follows:

> ...you [referring to a co-principal investigator in the social science

> focus group] have this questionnaire. You're going to collect data for the focus one area of the project but now we've decided we'll have a common process. I don't see that as being interdisciplinary. I see that as, you know, sharing but not really working together as an interdisciplinary, interdisciplinary team with an identity [Example 5.2. PECOS Management Committee Meeting, May, 1994].

A somewhat different position on the nature, meaning and purpose of interdisciplinary science was expressed by a co-principal investigator whose disciplinary background was soil science:

> ...I think there's a utopian idea out there about interdisciplinary research that as far as I am concerned is a bit utopian. And that we basically, we have to work with real people on real problems and get them to talk to each other and so forth and when we do that we'll have done a lot of things that, and share data, that people haven't done in the past...somehow I think that the proof of our interdisciplinarity is the process...a common bringing people together getting them working in one area, getting them to talk to each other, share the data and help each other with projects....[Example 5.3. PECOS Management Committee Meeting, May, 1994].

A third subjective position on interdisciplinarity was expressed by a co-principal investigator who's disciplinary specialization in the biological sciences was different from the speaker who had initiated the discussion:

> ...I think ultimately it's like when I built my front porch. My wife asked me, you've got to have a plan. And I sat down and I tried to draw a plan for the porch and I couldn't do it. So I started building it and then there was a 2 by 4 with this cut and it was cut wrong but I matched the other one to it and essentially there's a porch that's reasonably good....maybe what we need most of all is to uhm, we need to go out to the lawn and pick up a piece of grass

> and all of us need to pledge to this piece of grass that we're going to be sensitive to the mis-cuts and we're going to be open and always ask ourselves what can I gain from so and so and what can so and so gain from me [Example 5.4. PECOS Management Committee Meeting, May 1994].

Embedded in these subjective statements about interdisciplinarity are conceptions, experiences and evaluations of interdisciplinary inquiry as: "a model to follow", "an architectural framework" to build for, "a team with an identity", "a utopian idea out there", "working on real problems with real people", "a process", "reflecting on bias and learning from mistakes" and so on. Moreover, opportunities to observe these kinds of discussions were not unusual in PECOS in its early phases. Rather such discussions were relatively pervasive, emerging in the research focus groups, seminars, student meetings, the interdisciplinary graduate course, conferences, and workshops. Variation in subjective orientations to the nature, meaning and purpose of interdisciplinarity was also observed within particular sites at different points in time. At a meeting of the PECOS Management Committee several months into the project, conceptions of interdisciplinary science were expressed that differed somewhat from the ones reproduced above. Implied in the statement of one of the co-principal investigators working in the field of information systems, was a view that interdisciplinary integration could be achieved by delegating the task to a group of participants who would assume responsibility for devising and implementing an interdisciplinary methodology:

> ...well we did have a discussion about the formation of an interdisciplinary methodology group that would be a central integration group (Example 5.5. PECOS Management Committee Meeting, October, 1994).

Notably, the co-principal investigator who concurred with the idea of constituting a group of participants responsible for interdisciplinary integration was the same co-principal investigator from soil science who had previously described interdisciplinary integration as a process that could be expected to emerge out of participants agreeing to work with, and talk to one another:

> ...it would be a good idea to have a group of people that were really taking a look at our various different projects within the foci and so forth and also I guess to maybe integrate and evaluate the thinking that's going on and conferencing. To work sort of at this at a kind of general level where you're looking at the whole project and how it might relate (Example 5.6. PECOS Management Committee Meeting, October, 1994).

In these comments interdisciplinary science was being likened to a thing that could be produced or used, such as a "tool", a "task", an "artifact." Further, the comments imply a conception of interdisciplinarity as a task or a value that is applied to data or information after these data and information are generated using more traditional means. In these comments, interdisciplinarity was not being portrayed as an activity that was constitutive of knowledge, but rather as an action or a technique that is performed on pre-existing knowledge. As these various data were examined further, there didn't seem to be any consistent relationship between the social structural position of the person advancing a claim about interdisciplinarity and the content of that claim. As noted above, the claims about interdisciplinary inquiry that are reproduced in examples 5.1 and 5.4 were put forward by research faculty who occupied a similar disciplinary position in the scientific community and a common departmental location within the

university. The claims reproduced in examples 5.1 through 5.4, were advanced by persons in either the health sciences or the physical sciences and as such could be considered to be persons who shared common experiences in their disciplinary training and perspectives. Finally, it has been acknowledged that the different orientations to interdisciplinarity reproduced in examples 5.3 and 5.6 were comments that were advanced by the same person at different points in time within a relatively common social setting. Given that similar anomalies were emerging in the larger data set of PECOS communications about interdisciplinarity, it was postulated that the differences that were being expressed and observed reflected real differences in the meaning and practice of interdisciplinarity within different communication contexts of the PECOS case.

To pursue this hypothesis, a conceptual category of interdisciplinarity was constructed to capture the properties that were being attributed to interdisciplianrity in different communication contexts. The result was a conceptual category of interdisciplinarity that exhibited two dimensions. On the one hand, interdisciplinarity was being viewed and understood as a 'thing' or a 'fact' that was external to the individuals and that could be produced or accessed as a means to accomplish a given end. In this sense, interdisciplinarity was viewed and understood as a concept that exhibited 'objective' qualities. On the other hand, interdisciplinarity was being described and conceptualized as an "identity" or an "attitude" that individuals acquired through interacting and working with others to achieve a common goal or end point. In this sense, interdisciplinarity was being portrayed and understood as a phenomena that shaped, and was shaped by, the characteristics and qualitites of a subjective

consciousness at the level of the individual or the group.

Abstracting from the content of the deliberations, and focusing on what these individuals were doing when they were advancing their different claims about interdisciplinarity suggested that there may be a third dimension embedded within the overall concept of interdisciplinarity. Specifically, what the individuals were doing when they were doing, or talking about interdisciplinarity in various sites within PECOS was communicating their subjective opinions about interdisciplinarity to others. At the same time, they were listening to the subjective opinions that others were advancing about interdisciplinarity, comparing, contrasting, and critiquing these various positions in their deliberations. In other words, they were engaging in processes of argumentation in and about interdisciplinarity within the intersubjective world of PECOS.

Having 'discovered' that academics argue in their everyday interactions in the context of interdisciplinary research was not perceived to be a very startling or profound discovery at this stage of the field research study. Rather, it merely seemed to confirm what members of the academic community have always claimed to be doing in the context of their everyday practices as academics working within the boundaries of their respective disciplines, and the academy in general. Given this observation, a decision was made to extend out into the data that was being generated within the context of the PECOS Management Committee meetings to determine what became of these processes of argumentation over the longer term. In particular, were the members of the PECOS Management Committee arguing for the sake of argument, or were their arguments serving a social effect relevant to the development and operation of PECOS?

5.4. Interdisciplinary Actions

Over the course of the field study, the PECOS project developed from a relatively voluntary association of university research faculty interested in developing and facilitating a research program, oriented to a common area and problem, into a reasonably standardized and regularized entity that had secured a recognized, albeit temporary, status within the academic and administrative structure of the university community. The overarching question that this observation raised was "how did they get there"? Specifically, how did PECOS research faculty and project participants move themselves from **arguing about what they should do, could do, and wanted to do** to **knowing how** to do it? This question was initially addressed by looking more closely into what they actually did.

5.4.1. From Conceptual Framework to Organization

Transforming the conceptual framework for the PECOS research program into interdisciplinary practice required an intense and coordinated commitment by members of the PECOS Management Committee and research faculty responsible for the various sub-components of the program. Initially, much of the time of the research faculty responsible for PECOS was taken up with the challenge of constituting, coordinating, and mobilizing an organizational structure for interdisciplinary research within a university context where the academic culture, administrative structure, and financial operations were firmly rooted in the traditions of a discipline based knowledge structure. Particular tasks that the research faculty were involved in included: arranging for, and meeting with, the various participants in the project to review research goals and design research strategies; communicating and disseminating

information about the project to participants and to external parties; recruiting additional faculty to meet the needs of the project; recruiting students and potential partners into the project; establishing accounting procedures and mechanisms; and negotiating with various levels of the university administration, potential partners and stakeholders to secure the material resources and institutional spaces necessary for the successful constitution and operation of the project. At the end of the first year of operations, the PECOS Management Committee and project participants had managed to: establish an organizational structure for interdisciplinary research; secure public involvement in the project; refine and initiate the design and strategies for conducting the research; create a structure and process for training opportunities in interdisciplinary research; and participate in a variety of activities related to the transmission and dissemination of information to scholarly and public communities.

The constitution and regulation of an organizational structure for PECOS built upon, and extended the plans that had been set out in the original proposal. Overall coordination and direction of the project was the responsibility of the PECOS Management Committee. This committee was comprised of the original contingent of nine co-principal investigators who had collaborated on the research proposal, two representatives from the study area, and one representative from the body of graduate students who were funded by, or affiliated with, the project. To carry out its various functions and ensure continued and consistent interaction among the participants, the PECOS Management Committee established a regular schedule of monthly meetings. Although the vast majority of these meetings were held at the University of Saskatchewan, the intent was expressed and efforts were made to hold meetings at the

University of Regina and in the study area to the extent that it was feasible to do so.

In the first year of development and operations the PECOS Management Committee had constituted a substantial sub-committee structure to facilitate in organizing, implementing, and carrying out various aspects of the program. To ensure a direct communication linkage to the PECOS Management Committee, each of the sub-committees was chaired by a member of the Management Committee and was to include a representative from the student body (see Appendix III). Additional sub-committee members were recruited from the larger pool of project participants to the extent that it was possible and feasible to do so. At the end of the first year of operations, a total of six sub-committees had been struck. These included a Graduate Studies Committee, Information Systems/Geographical Information Systems Committee, Public Involvement and Communications Committee, Seminar Committee, Sampling Design and Data Collection Committee, and Interdisciplinary Research Course Committee. The mandate for each of the sub-committees was established by the PECOS Management Committee and each sub-committee was responsible for reporting back to the PECOS Management Committee at the regular monthly meetings.

Following the strategy that had been set out in the PECOS project proposal, responsibility for conducting the research resided with three research foci organized around the themes of: "Land Use Patterns and the Structure of Rural Communities" (Focus 1), "Environmental Pesticide Exposure and Human Health" (Focus 2), and "Health of the Land and its Biota" (Focus 3). Each of these research foci was chaired by one or two members of the PECOS Management Committee and was mandated to assume overall responsibility for planning and conducting the research, holding regular

meetings with researchers, and integrating student projects into the research foci and the project in general. A report of activities taking place within each of the foci was required at the regular monthly meetings of the PECOS Management Committee.

Finally, a project coordinator was appointed from the membership of the PECOS Management Committee and charged with the responsibility of "keeping an eye on things" in the intervals between regular meetings. The project coordinator was also responsible for ensuring that communication channels were established and maintained between the components of the project, as well as between the project and its various communities including the two universities, structures within the universities, the study area, and the public in general. Because of the importance of this particular position for ensuring the flow of information into, through, and out of the project, as well as managing the day to day affairs of the project, funds were allocated for appointing a half-time administrative assistant to assist the project coordinator in ensuring that the project was operating effectively and efficiently.

For all intents and purposes, the PECOS project was observed to develop into, and operate as a purposive and instrumentally rational organization oriented to realizing the overarching goal of producing high quality scientific knowledge on a level and scale that would have the capacity to inform policy planning in the environmental policy arena. Given this observation, it was not immediately clear what was "new" about PECOS. As pointed out in Chapter 4, big science and instances of scientists collaborating on mission-oriented projects that are linked to government are not a new phenomenon in Canada's history. Was PECOS simply business as usual, except on a grander scale that was explicitly linked to the somewhat more political domain of policy

inquiry? Moreover, how was the process of constituting and regulating PECOS as a public sphere related to the outcomes that were being observed as the project developed over time? Finding a response to these questions required an extension deeper into the transcripts that were being generated at the various meetings of the PECOS Management Committee meetings.

5.5. Interdisciplinary Process

At the outset of the field research component of this study, members of the PECOS project were confronted with a situation that exhibited the dual characteristics and tensions of an opportunity and a challenge. On the opportunity side, the project proposal had been successful in the Tri-Council Eco-Research Program grant competition. Moreover, it was one of only four successful proposals out of a total of 131 submissions to the competition. On the challenge side, receipt of the grant was conditional on the capacity of the PECOS researchers to achieve an overall budget reduction of fifty per cent, while maintaining the interdisciplinary integrity of the project. Subsequently it was learned that this had been the directive of the Tri-Council Eco-Research Program to most, if not all, of the funded projects.

The initial response of the PECOS Management Committee was explicitly instrumental. A directive was sent to all sub-components of the project to revisit their individual proposals and budgets and reduce them by fifty percent. Ultimately, the task of revising, reducing and renewing was returned to the level of the PECOS Management Committee for fine tuning and submission to the Tri-Council in the form of a "A Plan for Proposed Research Based on a Reduced Budget." Approximately five meetings were convened to deliberate issues relating to the revision of the research

strategy in light of the budget reduction and to attempt to achieve consensus on how to move forward with the project. A summary of the outcome of those deliberations is provided in the next section. The intent of the summary is not to focus on the substance or content of the decisions that constituted the outcome, although the substance and content is clearly an important part of it. Rather, the summary focuses on the form of communication that was established to convey the substance and content of the decision back to the funding agent. Specifically, it focuses on the form of argumentation that was established in the document that was submitted to the Tri-Council Eco-Research Program. The summary of the outcome is followed by a detailed analysis of how the argumentative deliberations among members of the PECOS Management Committee resulted in the decision to constitute the required document in the form of a dialogical relation with the funding agent.

5.5.2. The Outcome: "A Plan for Proposed Research Strategy Based on a Reduced Budget"

The outcome of the PECOS Management Committee deliberations were summarized in a four page document as per the requirements that had been established by the Tri-Council. This document included a brief narrative, an enumeration of the standards that had guided the decisions, a summary of the procedure they had used, a description of the actual decisions, their anticipated implications, scientific, policy and pragmatic justifications for the decisions, and indications of the strategies that were being taken to carry through with those elements of the original proposal that had been dropped in order to comply with the conditions established by the funding agent. The document was a very standard, instrumental, and purposive-rational document that

expressed the consensus that had apparently been achieved among the research faculty who were responsible for and participating in PECOS. It was also a document that could be construed as strategic-rational, normative-rational, or a combination of all three.

Deconstruction of the narrative component of the document indicated that in addition to relaying information to the funding agent, the document was being used as a communication media to advance and contest a number of validity claims relevant to the redefinition of the situation of the PECOS project. The narrative component of the document concluded with a statement of the evaluative criteria that the PECOS Management Committee had established to comply "with the Tri-Council's instructions to"'retain the basic cross-disciplinary thrust' of the proposal, while reducing the number of students and researchers involved." The guidelines were reported as follows (PECOS Document, May 1994:2):

- The importance of the individual study component to overall study objectives, and the degree of interdisciplinariness of the proposed work;
- Possibilities to link with, or complement, other Green Plan programs in Saskatchewan, such as the Agriculture Canada Green Plan;
- Possibilities of obtaining supplementary funds from external sources, and for linking projects completely funded from other sources to our study;
- Likely contributions of the study component to local concerns, and objectives of providing knowledge to influence policy and economic opportunities.

There was no explicit indication of the weight that had been given to any one of the criteria listed, hence it was presumed that the weighting conformed to the rank order in which the criteria were actually listed. In other words, decisions had been made with an orientation to the anticipated contributions of the project to the "science" of interdisciplinary science, the "pragmatic" potential for realizing and establishing strategic and collaborative relations with various partners who would be in a capacity to work with PECOS in the realization of common goals, and the "practical" potentials for producing knowledge that would have the capacity to inform policy level decision making.

In the narrative leading up to the statement of standards that had guided their decisions, the document advanced and contested validity claims that were related to "truth", and "authenticity", but which explicitly thematized "normativity." For example, it was stated in the document that:

> Assessor 4 considered that the study team was made up of experts who "already know what is ideal and harmonious...and the job of the experts then becomes one of educating an ill-informed public who do not know what they are doing. A rural resident who read the proposal reacted similarly. A top-down structure guided by experts certainly is not our perspective or intention.

In this statement, truth, normative, and authenticity validity claims are thematized and a number of social actions are performed at the same time. Specifically, the validity claim of the assessor is acknowledged, and it is also acknowledged that it has truth value by virtue of the fact that it has been confirmed by an external authority who would be "in a position to know." At the same time, the acknowledgment places the

normative appropriateness of the assessor's claim into a contested domain "in this situation." In other words, the assessor's claim is considered to embody general truth validity, but in this situation it is lacking normative validity because residents of the study area were consulted. The narrative proceeds to advance a series of truth claims to warrant the normative claim that the assessor's conclusion was inappropriate in this situation:

> The problems identified [in the proposal] are consistent with those listed by priority-setting groups (with public input) such as the Saskatchewan Round Table on the Economy and the Environment, the workshop on Health and Safety Issues in Sustainable Agriculture, and the Agriculture Canada Green Plan...We have had one meeting with an agricultural board within the study area, and have asked their input into focusing our attention in particular areas, and contributing to the final design of the study. The input of local people has influenced already the character of proposed graduate study themes in Focus 3, Health of the Land and Biota [PECOS Document, May 1994: 1].

It is not clear from the information available in the document, however, if the researchers' constitution of a dialogical, or argumentative social relation in this context is strategically, defensively or communicatively motivated. That is, were the research faculty simply citing the particulars of their situation as a means to invalidate the assessor's claims and defend their particular interests; or were they genuinely attempting to establish a social relationship that was oriented to, and motivated by, an interest in achieving a mutual understanding between the project, the funding agent and the peer review system? Response to this question called for an investigation into how the researchers had arrived at the outcome that was set out in the document. An

extension into the deliberations that transpired among the research faculty who produced the outcome was undertaken to gain additional insight.

5.6. How Did They Get There? Redefining the Situation in its Context

Entry into the field of PECOS coincided with one of the Management Committee's final meetings to achieve consensus on their revised research strategy in light of the budget reduction that had been imposed by the funding agent. Given the importance of these decisions for the future of the project, the entire meeting had been dedicated to finalizing those decisions and forging an agreement on a draft of the PECOS Management Committee's response to the Tri-Council. Portions of those deliberations have been extracted from the original transcript of the meeting for detailed examination and interpretation. The segments have been extracted from the overall discussion on the basis of the social effect that these comments and their interpretation in the situation were observed to have on the actual outcome of the deliberations.

The issue of the normative validity of Assessor 4's comments was introduced into the deliberations of the PECOS Management Committee by one of the principal investigators whose research focus group had been singled out as a target for criticism in the assessor's report. When this individual originally suggested that it was in the general interest of the committee to review the assessor's comments and respond, the validity of that claim was resisted by other members of the group. A portion of the discussion is reproduced below:

PI1: Well I was wondering about the reviewer's comments. Should we review the comments?
PI2: But what would we do with them

though?

PI1: Well it seems to me that there are some comments that we have to address....But I'd like that on the agenda anyway.

PI2: Ya. Ahh, what would we use that for? I mean, maybe it's a good idea but are we submitting to them more than they want?

PI1: Well, it seems to me that they wanted something.

PI2: Maybe, we, well I think as we can work those things into our four page revised thing I would think that's important. But I don't know if there's a...

PI1: You don't think it's needed?

PI2: I don't know for sure PI1.

PI1: Because I thought the funding coming was contingent on addressing the comments.

PI3: No. I read it that way too but I read it that our four page response would not have to address them so I think it is good to have them identified and make sure that we've covered them.

PI1: I'm wondering if, well I have worked on them some in revising our budget.

PI2: Okay sure, no, I thought we would deal with each focus individually.

(PECOS Transcript, May 4, 1994)

The primary reason that is given for resisting the co-principal investigator's request is that the funding agent has not asked the committee to respond to the assessor's comments and consequently, a review of the assessor's comments and the incorporation of a response in the document for the funding agent would serve no overall utility to their interest in completing the task at hand. Therefore, the claim that it is in their general interest to respond to the comments is not considered to be a valid truth claim in this particular case. It is acknowledged, however, that a review of the assessor's comments may have normative validity within the group, since the comments could

have some utility for informing how the project developed into the future.

Essentially, the reviewer's comments had challenged the validity of the PECOS researchers' claim that they were in fact proposing to practice science in a different way and in doing so, had placed the interdisciplinary and community based integrity of the research program into a contested domain. As pointed out in the assessor's report:

> ...this is a good, sound proposal; ...[but] what is being proposed is traditional research in a way that it should always have been done: efficiently, thoroughly, at a scale and depth at which complex questions have a reasonable probability of being answered, using the skills of many disciplines in a setting which promotes mutual respect, and grounded in the real world where people live. What makes me uneasy is that there appears no recognition in the research program of the need for intellectual as well as empirical integration as a basis for dealing with tensions in key inter-relations.
>
> (PECOS Document, May 4, 1994)

Having acknowledged that the proposal was "good science," the assessor went on to question if the proposal for "good science" also had the capacity, or potential to contribute to, and inform "good policy." The assessor claimed that the interests expressed in the proposal implied that the experts knew what was "ideal" and "harmonious" and that they were in fact privileging their interests and interpretation of the needs of the situation, over the needs interpretations of others in the situation. The "others" interests that were referred to in this context were the interests of the residents of the study area, the interests of policy makers, and interests of the public more generally:

> ...what if the community's ideals and

> expectations are at odds with what this impressively large team of experts thinks is "best" for them? What if the risks they choose to live with are different than those which the experts think they should want to live with?... How does one balance the desires of the individual with the needs of the community?
>
> (PECOS Document, May 4, 1994)

The assessor concluded his/her comments with the suggestion that:

> What is missing from this proposal is a clear recognition that neither integration of technology, nor of managerial structures will necessarily translate into the kind of empirical and conceptual integration which will be necessary to make progress in understanding the complex problem(s) being addressed.
>
> (PECOS Document, May 4, 1994)

When the issue came up for discussion on the agenda, the question of the utility of incorporating a response to the assessor's criticism was raised once again. At this point, PI1 responded by arguing that a response was justified because the claim that the assessor was making was not true in this case. At least, from the perspective of this speaker, it was not true in the case of the focus group that had been explicitly identified in the assessor's comments.

> PI1: ...in terms of the first criticism, that we are involved as experts and that we know what the problems are. I know from our group the problems do not come out of our heads. They come out of this public policy and development process that we went through. We had certain members at the Regina Conference and I'm looking back at time now, I think when we first started meeting we were talking about,

> what is it two years ago now, where we met with farmers and residents from across Saskatchewan and all of the stake holders. And we have the reports and that brings in , ...you know the change in community structure and there are recommendations that were addressed in all of the sessions that we address in our proposal and I just wondered whether that might be included in the [response].
>
> (PECOS Transcript, May 4, 1994)

The speaker went on to provide a detailed chronology of the actual events that had taken place and that had informed the research interests that were articulated in the focus group's component of the project proposal. The speaker concluded his/her comments by expressing the view that the focus group that had received the brunt of the assessor's criticism for behaving as experts was in fact the very group that had diligently worked to establish channels of communication between the project, the various groups within the community, and the public in general. This speaker's commentary concluded with the comment, "But I don't think that we can work in isolation...."

Others acknowledged the final statement as a true assessment of the overall situation, but as a statement that was not entirely factually valid if it was intended as an evaluation of the source of the research interests and motivations of other components within the project. For example, PI2's immediate response was to concur that the sub-components could not work in isolation and to draw attention to a broader scope of community consultations which were influencing research themes in other areas and which were reflected in the particular research interests that had been articulated by other sub-components within the PECOS proposal:

PI2: No, and that made me think about the ahh, I don't know, the

> PFRA and the Agriculture Canada Green Plan. They had lots of grassroots input, where the farmers along with extension people and others, I think identified key problems and when it came to the conference on soil and water quality, degradation and biodiversity were the themes. And so we're consistent with, and the same with the round table on environment and the economy. They came up with the same kind of, and that had a lot of citizen input of various types. So I think we could mention in our response....
>
> (PECOS Transcript, May 4, 1994)

A co-principal investigator from another foci interjected at this point to confirm that their research interests had also been informed by an extended history of consultations with the public, and that they were not simply motivated by, nor did they intend to serve the self-interests of members of any particular group or the particular science interests of researchers within PECOS more generally:

> PI4: I think PI1's sort of approach in terms of identifying a number of ways in which we really have done work with the communities. Uhm, I know, I mean if somewhere you can use the language, in two paragraphs. You know I think about the people in [our department] and _____ has been attending meetings, community meetings throughout the province. _____has, uhm, done lots of work prior to PECOS on land use. Land use questions and on, on policy issues. And, uhm, a number of us have some linkages to the agricultural community. We're not just researchers from the university but we are, we have some depth in our ties back to agriculture. But I think we need a holistic flavour that all of this is going on in the background.
>
> (PECOS Transcript, May 4, 1994)

At this point in the deliberations, PI3 entered the discussion to suggest that there was a more fundamental issue arising from the assessor's comments that warranted

discussion among the group. Moreover, the reasons for that discussion were portrayed by the speaker as extending beyond an interest in demonstrating that the assessor's assumptions had been incorrect and therefore, inappropriate in this instance. For this individual, the normative validity of grounding either the research, or policy implications of the project in the needs interpretations and interests of the local community was an issue that had not been resolved to the satisfaction of all participants in the project. As stated by PI3:

> I've grappled with the issue for some time and you know in one of our early plans there was some wording in there that the purpose of this endeavour was to find out what ideas we should reach and [PI2] kind of toned that down and rightly so. I came to this thinking that what has been the issue all along, in question, [is] development and settlement was an overall goal. Things just sort of took a life to themselves and developed themselves....there was no sort of endpoint that we wanted to reach and where should this be and where it shouldn't be....But that is the top down heavy approach. This is what we think should happen and here is wherever the rest of the world is...In our group we went through this and ahh, we sort of tried to come to grips with on the one hand doing what the locals felt we should do...and on the other hand [knowing what we know] maybe, maybe education is in order. I'm sort of caught between trying to respond to popular opinion and on the other hand guide it.
>
> (PECOS Transcript, May 4, 1994)

PI3 concluded the commentary with the truth validity claim that they had agreed to "a holistic look at the prairie ecosystem," the normative validity claim that "if we just do what it is the community wants, that's no good either," and the expressive validity claim that " I'm not quite sure how we steer through that."

In their deliberations to this point, members of the PECOS Management

Committee were confronted with a number of issues that were in dispute. Specifically, a question had been raised about the particular needs and interests that were motivating the research interests of individuals within the different sub-components of the project. As a consequence, the presupposition that the various components were pursuing a 'common interest' was in dispute. Secondly, a question had been raised about the normative validity of grounding research and policy interests in the particular interests and opinions of local residents. This question placed the principle of realizing a 'common interest' among the various participants into a contested domain.

As the discussion proceeded, a third speaker suggested that it was in the general interest of the group to attempt to interpret the meaning of the assessor's comments for the project as a whole and not simply in terms of the truth or normative validity of those claims for any particular need or interest within the project. The position advanced by the speaker was that an interpretation of the assessor's claims would serve a twofold purpose in realizing the common interests of the group. Firstly, it would provide a means to address their immediate problem of revising the overall research strategy in light of the conditions imposed by the Tri-Council. Secondly, it would provide a means to clarify in their own minds what it was that they were proposing to do, how they were proposing to do it, and how the various persons who were participating in the process were going to be convinced that their participation had been worthwhile and had contributed to the realization of both individual and common interests.

PI5: I think PI3's account is actually very useful and it's quite clear of course that these group meetings with the community ...that these meetings are a part of the wisdom, response, interaction and so on that we were all there and

> potentially involved in. Ahh, my sense, however, in regards to assessor four was a single concern that I saw expressed in three different ways was a concern over the problem of integration. ...there's an expression of concern over the overall intellectual integration of the project as a whole....There was a concern with the way in which the focus group was integrated into the project, the other components of the project, and I think that there was a concern expressed about the integration of the community and policymakers into this whole process. It seems to me that the comments of that assessor as such were tagged onto those three levels of concern about the question of integration....I had a sense also from the summary commentary that was provided with all of these, they, that's what the overall problem that they still see...what are we going to do with all of these studies and data and how are we going to be convinced and the people that we are doing the studies with in the area, the policy makers and the funding agent going to be persuaded in fact that there has been the formation of these new partnerships....But it might be worthwhile trying to address at this stage before the fact, the problems that you just raised PI3, is that how are we going to try to ensure that, not only have we consulted in abstract general terms the concerns of the scientific and policy making community, how are we going to involve people in these particular projects.
>
> (PECOS Transcript, May 4, 1994)

This speaker's interpretation of the assessor's comments is that they have been addressed to the group as a whole and not to any particular component or group within the project. Further, it is suggested that the concerns raised by the assessor and the Tri-Council more generally, are oriented to a particular problem that was not adequately addressed in the original proposal. The outstanding problem that the speaker identifies is that the group as a whole has yet to address the fundamental problem of establishing procedures for integrating the various components and participants into a process that will allow them to work toward the realization of their intellectual, empirical, and practical goals. With

this commentary, the speaker seems to be encouraging the members of the group to set aside some of the assessor's more directed comments, acknowledging that the truth validity and normative validity of the assessor's criticisms are justifiably in question in this situation. At the same time, however, it is being suggested that the comments may have normative force for guiding the conduct of the group as they work toward realizing their immediate and long term interests.

The discussion that followed from the articulation of these various interpretations and positions on the nature of the problem that was before the committee was lengthy, and at times, eristic. The intensity and outcome of the process in this situation were aptly summarized by PI3 with the comment that "We essentially, I think, exposed a few thorns and we've highlighted on some things, some action items that you know are first priority and these things you can take with you." As the discussion drew to a close, it was notable that despite having "exposed a few thorns," the participants appeared to be satisfied amongst themselves that they had reached a level of agreement that they were reasonably comfortable with, and were willing to live with for the time being. Moreover, closure to the discussion had not been imposed by the chair, nor had there been a request from any of the participants to resort to a formal procedure such as registering a vote in order to bring closure to the deliberations. Rather, the closure in this case had seemed to emerge out of the discussion itself. This interpretation was confirmed by several of the comments that the participants articulated as they prepared to move onto the next agenda item. For example:

> PI2: I think it's going to work. We do it. And the main thing is to do it and not to spend too much time discussing it and...

PI1: Maybe just conveying in this letter that ahm, interdisciplinarity is in the spirit of this whole project and it is the philosophy of the management of this project.

PI5: And _____ made the point, we do have our own interests and goals and objectives and imperatives which are going to guide what we do and how we do it and if we do it and so on and so forth. But I think what we have to collectively and individually do is to say okay, we'll bring to the table with the people that we want to, that we require to work with on this and others. We'll bring those scientific research imperatives with us and say now, how can we find, given those things, how can we find a way to work togther in a way that is mutually agreeable and constructive and so on and so forth. Rather than being solely driven by our own imperatives and I think what I have picked up by working with this group over these last couple of years is that all of us are in principle and in practice committed to taking our scientific imperatives into the community and saying okay, how can we do what we need to do in a way that is going to be useful and interesting and accessible and ahh, productive for you as well as us.

(PECOS Transcript, May 4, 1994)

Following these comments, the discussion turned to the pragmatic task of getting a draft of their agreement onto paper, circulating that draft for additional commentary, and deciding on a time line so as to ensure that the document would be finalized and submitted to the Tri-Council within the time frame that had been established. The tension and conflict which had been present in the discussion only moments before appeared to have dissipated, and individuals volunteered to make their time available to deal with the pragmatics of the situation so as to ensure that the document could be finalized in a timely fashion.

That the consensus that had been realized in this situation was a fragile one became immediately apparent as the group moved onto the next item on the agenda. That agenda item moved the discussion into a consideration of the budgetary issues, and

of the strategies that the various groups were taking to accommodate the budgetary conditions that had been imposed by the funding agent. The deliberations in this case were observed to escalate to an intense level of argumentation among particular participants and an agreement on contentious issues and validity claims were not realized in the context of the meeting. In fact, a decision to adjourn the meeting and revisit the budgetary issues at the next meeting was imposed by the chair in this case. The decision was voiced at a point in time when particular individuals had reached a point of accusing one another of having acted strategically, and having jeopardized the capacity of the group to realize the more general interests of the project. At the next meeting when the budgetary issues were revisited, the personal tensions that had emerged into the situation appeared to have been defused and the group was observed to come to a level of agreement on budgetary details which allowed the group to finalize the revised research strategy document. As the project developed into the future, it became apparent that this too had been a fragile agreement as budgetary issues continued to be thematized as contentious issues within a variety of the public spaces of PECOS.

The analysis of a process of practical argumentation that has been reproduced here was an exemplary situation of communication selected from those practices that were observed to be more prominent and pervasive in the constitution and regulation of PECOS. From these observations and analysis it was concluded that the practice of public reason in the form of practical argumentation within PECOS was a real condition and potential in the social situation of the project. Moreover, it was not simply a practice that was undertaken for the sake of arguing. Rather, it was a practice that was

engaged in for explicit purposes, and it was a practice that produced social effect. The outcome was realized in the form of an agreement that appeared to be grounded in a level of mutual understanding which the participants seemed to be willing to live with in order to get on with the larger task of realizing the goals of the project. At other times, agreements were not achieved within the particular situation and other measures or procedures were introduced into the situation to enable the participants and the project to move forward. For example, in some situations the participants were observed to resort to a vote on contentious validity claims as a means to forge a decision, thereby resorting to a procedural solution that they could all agree to. In other situations, it seemed to be the case that negotiations and discussions were taking place outside of the public space of the PECOS Management Committee meeting that were operating as a means to create the conditions necessary for realizing an agreement within the context of the public space of the Management Committee meetings. The data required to assess this latter speculation, however, were not available within the field research component of this study.

5.7. Assessing the Rationality of Outcomes

Prior to examining the practices which produced the narrative that was set out in the revised research strategy document, it was an open question whether the research faculty were practicing instrumental or purposive rational action, normative or communicative rational action, or strategically challenging the validity claims of the assessor as a means to defend and realize their own particular needs and interests. Given the examination of those practices which preceded and informed the outcome, the question of what form of rationality was expressed in the narrative of the document may

now be posed.

Reconstructing this situation within the framework of a theory of communicative action, produced evidence to suggest indicate that the decision to establish an argumentative or dialogical relation with the funding agent in this situation was an expression of communicative rationality. That is, the decision had emerged from a process of collective critical reflection among persons who demonstrated a rational disposition to advance, contest, and evaluate their own and other's validity claims about the situation in a situation that was open to the participants who were there, and motivated to participate in the deliberations. Further, the analysis of the practices that has been reproduced here suggests that the process of collective interpretation in the situation performed two functions. On the one hand, by advancing, contesting, and evaluating the validity claims of the participants in the situation, the individuals were observed to constitute themselves as a deliberating public with the capacity to function as a "court of appeal" for individuals who were involved in, and affected by, the situation. Specifically, the needs, opinions, and interest positions of individuals and groups who were participating in the project were thematized and confirmed, clarified or altered as the participants worked together to produce a definition of the situation that they could live with for the time being. On the other hand, there were indicators to suggest that the deliberations in this case had also functioned as a social learning process for the participants who were involved. Given the statements that individuals advanced at the conclusion of their deliberations, there was a suggestion that the participants had renewed their particular and general interests in finding ways to work together to realize the goals that they had set for themselves in

the original project proposal.

From an external perspective, the participants were observed to have entered into social relationships with one another in which they expressed their subjective autonomy by publicly challenging the validity claims that were being advanced by others who were also expressing their subjective autonomy in the situation. At the same time, the subjects demonstrated their accountability to others in the situation and required others to do the same by articulating and evaluating the reasons that informed the various validity claims that were thematized in the situation. As these individuals participated in a process of practical argumentation, they were also observed to be renewing and refining their beliefs about the normative validity and theoretical integrity of their project, clarifying the order and legitimacy of their social relationships, and establishing and reestablishing their own statuses and motivations with respect to the project and to others who were involved in the project.

The analysis and reproduction of this particular example have not been undertaken to suggest that every communicative action in the PECOS process was an example of communicative rationality, or that processes of strategic and instrumental actions were not observed to be an aspect of social interactions within the PECOS project. At the same time, however, the scenario that has been investigated in this situation was not entirely unusual in the PECOS project. In fact, argument and disagreement on a variety of issues, at a variety of levels of deliberation in a variety of situations were observed to be relatively prominent and pervasive features in the PECOS process. Moreover, many of these arguments were not simply examples of academics arguing for the sake of argument. Rather, they were processes of

argumentation that emerged out of the situation and were explicitly oriented to realizing both individual and general interests and goals within the situation. The analysis reproduced in this chapter is provided as a demonstration of how the participants in the PECOS project used their "know how" to participate in the intersubjective world of critical argumentation as a means to assess and clarify what they knew they could, should, and wanted to achieve through their participation in the project. In other words, to demonstrate how they constituted, regulated and used their intersubjective world to realize a rational understanding about items within their common objective world, and within their privileged subjective worlds.

Given that the deliberations that produced the narrative in this case were found to conform to the conditions of practicing communicative rationality, it has been concluded that the argumentative relationship that was subsequently established with the funding agent was also a rationally motivated social action. That is, it was grounded in a situation of mutual understanding that was constituted out of the lifeworld of the project and communicated into the system of peer review and the granting agency as a means to clarify a misunderstanding, and communicate a potential for extending the social learning outcome that had emerged into the situation.

5.8. Summary

The social rational character of the intersubjective world of the PECOS project has been investigated in this chapter. More specifically, the analysis has focused on an exemplary communication situation that was observed to emerge and transpire in the context of PECOS Management Committee meetings. The social interactions that emerged in the context of the meeting was selected as a focal point for analysis because

the social conditions of the PECOS Management Committee provided a situation within the PECOS project that approximated the ideal of a general symmetry of social condition among the project participants. Given the general symmetry of social condition that characterized the PECOS Management Committee, it was reasoned that it was a data collection site within the field research component of this study that created the greatest potential to constitute and regulate itself as a public social space that exhibited a capacity to function as an ideal public sphere. As such, it was identified as a data collection site in which a potential was created for observing how PECOS participants used their capacity to participate in processes of practical argumentation within a public sphere to realize mutual understanding on defeasible validity claims. In other words, the PECOS Management Committee meetings were identified as a public space within the PECOS project that provided an opportunity to observe social learning processes within the PECOS case that were "rational in other than an instrumentalist sense" (McCarthy, 1991: 50).

In the theoretical framework that was elaborated in Chapter Two it was argued that within the framework of Habermas' theory of communicative action participation in "[a]rgumentation makes possible behaviour that counts as rational in a specific sense, namely learning from explicit mistakes" (Habermas, 1984: 22). More specifically, it was noted that Habermas has advanced a reconstructed conception of validity that is grounded in "reasoned argument concerning defeasible validity claims" (McCarthy, 1991: 170). In advancing a reconstructed conception of validity that emphasizes the test of defeasibility or voidability as opposed to the test of defensibility or justification, Habermas provides a theoretical justification for the rationality of making explicit and

learning from mistakes and misunderstandings in concrete social contexts. In Chapter Three it was argued that this is also the logic that underlies and informs the methodological position of the extended case study method. In describing the logic of the extended case study method, Burawoy (1991: 10) has argued that "instead of proving a theory by corroboration or forsaking a theory because it faces falsification, [the] preferred approach is to improve theories by turning anomalies into exemplars."

The analysis undertaken in this chapter has demonstrated that in situations that approximated the ideal of a general symmetry of social condition, members of the PECOS Management Committee did exhibit a rational disposition to subject their validity claims to the critical test of defeasibility. In those instances where members of the PECOS Management Committee exercised this capacity they also demonstrated a rational capacity and disposition to learn how to coordinate their social actions in ways that were rational in a communicative or social rational sense as opposed to simply an instrumental or purposive rational sense. In the next chapter, the analysis of the forms of rationality that were practiced in the public spaces of PECOS is extended to an investigation of social interactions and relations at the macro-level of the PECOS project.

CHAPTER SIX
FROM KNOW HOW TO KNOW THAT:
EXTENDING PECOS RATIONALITIES IN PECOS PUBLIC SPACES

This chapter examines the public spaces that emerged within the PECOS project and the forms of rationality that were seen to be operating in the social coordination of practices of interdisciplinary inquiry and conduct within those public spaces. It moves the investigation from the micro-level analysis of processes of argumentation in the intersubjective world of PECOS Management Committee meetings to a macro-level examination of the communicative practices that were found to emerge in the intersubjective worlds that constituted and regulated the PECOS case at the level of the project. The purpose of the investigation is to make visible the forms of rationality that emerged to dominance within the various public spaces that were constituted and governed by the PECOS participants who were interacting in those spaces. A particular emphasis is placed on investigating the social contextual conditions and limits that framed the practices and patterns of argumentation that emerged in the public spaces of PECOS. This patterning is reconstructed as a means to follow the movement of instrumental and communicative rationalities that emerged out of the lifeworld of the PECOS Management Committee into the public spaces of the project where they eventually settled and emerged to dominance.

6.1. Reproducing The Rationality of the Organization

As previously noted, the development, operation and integration of the PECOS project had been conceived within a conceptual framework that was grounded in systems rationality. In the project proposal, the intellectual and administrative integration of the project had been described in terms that portrayed PECOS as analogous to the interrelation of the components of the ecosystem that established a substantive focus for the study:

> The overarching mission of this research is to quantitatively measure the health of the land and its people in a prairie dryland ecosystem. To assess the sustainability of the prairie ecosystem and to answer the questions posed...in this proposal, three distinct, but interrelated, foci are defined that reflect the social, health, and physical and biological sciences respectively, in a shared general systems structure. In any ecosystem, there are subsystems which are both parallel and hierarchical in their interrelationships. Each subsystem has a set of inputs, a set of internal processes, and a set of outputs. Usually there is a set of feed-back loops as well, along with a set of regulatory signals from outside the subsystem, and a set of regulatory signals exiting from the subsystem. Energy, material, and information flow into, through, and out of, each subsystem. ...The component subsystems may be arranged in convergent, braided or divergent "streams", studied in depth, measured and modelled, and later reassembled into more and more adequate and holistic descriptions and models of the whole ecosystem (PECOS Project Proposal, October 14, 1993: 6.6)

The particular strategies that were identified to facilitate the capacity of the PECOS project to function as an integrated system were computational (i.e., the integration of a hierarchy of data, information and models using Geographical Information Systems technology specifically, and Information Systems Technology in general), conceptual (i.e., crafting specific research questions within research foci to ensure that resolutions

to those questions required input from other research foci) and organizational (i.e., integrating research personnel, methodologies, and sample design across all projects under the overall direction of the PECOS Management Committee).

As observations in the field research component of this study proceeded, indicators emerged to suggest that PECOS was not simply behaving as an integrated system of interdisciplinary research. Rather, the reconstruction of the intersubjective world of the PECOS Management Committee that was undertaken and discussed in Chapter Five led to the conclusion that in many aspects, PECOS was constituting and regulating itself as a "public sphere." That is, PECOS was constituting and regulating itself as a public space in which social processes of disputation and argumentation on a variety of factual, normative, and expressive validity claims were functioning as a means to realize the social coordination of the actions of individuals who were participating in the project. Given the observations and conclusions that had emerged from the analysis of the micro-level interactions of the PECOS Management Committee, a decision was made to extend the analysis out in two directions. Firstly, the analysis was extended out to facilitate an examination of how the process of coordinating social actions at the level of the PECOS Management Committee through processes of public argumentation was developing over time. Specifically, did the PECOS Management Committee continue to behave as a public sphere over the duration of the field research component, or were there indicators to suggest that its processes of social interaction were changing over time? Secondly, the analysis was extended out into other areas of the PECOS Project to investigate how processes of social interaction in the various public spaces of the project were similar to, or different

from, those that were being observed to be occurring at the level of the PECOS Management Committee. The process and outcome of the first of these two extensions into the data that were generated from observations at the macro-level of the PECOS project are the primary foci of discussion in this section.

As indicated previously, a condition of general symmetry was found to be a primary characteristic of the status and position of the individuals who constituted the PECOS Management Committee at the outset of the project. Moreover, at the outset of the project, the use of formal rules and procedures for regulating social interactions within the PECOS Management Committee meetings had been observed to be relatively non-existent. Formal agendas and minutes from previous meetings were seldom available to members prior to their attendance at meetings. In fact, agendas for meetings in the early stages of the project were frequently constituted within the context of the meeting, building on or around themes that were identified by the chair and co-principal investigators as items that needed to be addressed. When minutes were taken, a volunteer was recruited from the participants, or the chair would assume responsibility for summarizing the substance of the meeting after the fact. When minutes from previous meetings were available, they were usually distributed at the next meeting along with any other documentation that was available and deemed relevant to the themes of discussion that were expected to arise in the context of the meeting. Notably, one rule that did seem to be followed consistently from the outset of the project was the adoption of a speaking order. Seldom would the participants interrupt another speaker while he or she was speaking, and persons usually waited to be recognized by the chair before taking their turn to speak.

Not everyone in the group exhibited the same level of comfort with the apparent lack of procedure and formality that was characteristic of the early meetings of the PECOS Management Committee. Frequently, individuals would voice their discomfort with the situation and seek to encourage the adoption of standardized rules of order for the management process. When these normative positions were voiced, they were generally accompanied by a variety of reasons that were advanced to justify the need for a more regularized order within the group. Reasons that were given included references to a need to protect the rights and interests of the individuals participating in the project, a need to document instances where a general interest had been recognized and agreed to so that it would be available for future reference, and a need to protect and preserve their individual and collective reputations from harm should questions arise about the decisions that were being made and the actions taken in the everyday affairs of the project. Other reasons that were frequently given for the introduction of formal procedures of order related to the need for the faculty researchers to have access to information that would allow them to prepare ahead of time, participate more effectively and efficiently in the project, and balance their other duties and responsibilities as university faculty with the significant amount of time that the project was demanding as it moved into its operational phase.

At other times, increased order was introduced into the processes of social interaction within the PECOS Management Committee meetings by a particular member engaging in an action that was a form of order. For example, the practice of calling for a motion to officially recognize the appointment of a new member to the committee, tabling a motion to seek clarification on the different positions that

individual members were taking on issues, or using motions as a strategy to push issues to a more explicit level of deliberation and decision. In these latter cases, it was apparent that increased order was being introduced into the situation as a means to pursue and potentially realize the particular needs and interests of individuals, or of sub-components within the project. As the project developed and became increasingly complex and diverse, the need for, and interest in, establishing more regularized orders and procedures moved to a level of necessity and emerged as a generalized interest among the members of the PECOS Management Committee and the project in general. This was particularly evident as grant monies flowed into the project and needed to be allocated out into the various sub-components and individual projects that were attached to faculty and graduate student projects and stipends. Overall, as the field research component of this study proceeded, formal and regularized procedures of order were increasingly institutionalized as a means to direct, administrate and manage the project.

With the trend toward increased order and bureaucratization of the social coordination of the actions of the PECOS Management Committee, both subtle and marked changes in the communicative practices of the members of the PECOS Management Committee were observed. In particular, the practice of discursively redeeming validity claims in the context of the PECOS Management Committee meetings was increasingly replaced by forms of reporting and accounting to the PECOS Management that were more monological in form than had previously been observed. For example, the chair or designate of the respective foci and sub-committees within the project would table their regular report, provide a brief synopsis of its content, invite questions from the participants, and request a motion for its acceptance by the members

of the PECOS Management Committee. Although opportunity to discuss issues arising from the reports remained available to the participants, these opportunities tended to be used to elicit or convey information rather than to explicitly challenge or contest the validity claims that were being advanced in the reports. When issues and claims were challenged or contested in the discussions of the Management Committee, there was an increasing tendency to strategically displace these deliberations into other structures and locations within the project for analysis and recommendations on potential resolutions. The recommended resolutions would then be returned to the PECOS Management Committee, subjected to further moderate discussion, and ultimately moved to the level of decision. Overall, the engagement in relatively open ended argumentation that had been a prominent practice in PECOS Management Committee meetings during the early phases of the project was observed to be giving way to a much more streamlined, regularized, and systematic model of effective and efficient management and administration for the project.

The adoption and institutionalization of instrumental rational modes of social coordination at the management level of the PECOS Project was clearly evident as the project approached its midpoint of operations in December 1995. At that point in time, concerns were being raised within various sub-components of the project about the need to develop, adopt and implement a formal policy statement on how relations within the project and between the project and other institutional structures in its environment were to be constituted and regulated. The justification for the action was expressed in terms of the need to promote a more effective, efficient, and equitable system of management and administration. In response to the expressed need, an ad hoc

committee was struck from among the members of the PECOS Management Committee and charged with the responsibility of developing a set of guidelines for the management of PECOS. The guidelines that emerged out of the deliberations of the ad hoc committee, although targeted to the particular conditions of the PECOS project, were fairly standard in form:

- The Management Committee will meet monthly on a fixed day;
- The agenda of each meeting will include a report from each Focus Group and each of the sub-committees of the Management Committee;
- An Executive of the Management Committee consisting of the Principal Investigator, the Program Coordinator, the Chairs of the three Focus Groups and a Regina appointee will meet at least once between Management Committee meetings and additionally as required;
- An Official list of all sub-committees and their current membership will be prepared and circulated to all participants;
- To facilitate overall management of the budget, the monthly reports on individual research allocations in Saskatoon will be sent to the PECOS office and distributed from there;
- All meetings of Focus groups, sub-committees and ad hoc groups will be arranged through the PECOS office;
- A monthly newspaper will be prepared and circulated to all participants;
- PECOS seminars will be held on a weekly basis in Saskatoon at least during the academic year;
- The communication network and the information processing system should be established with all possible haste;
- The supervisory committee of each PECOS graduate student should include a member brom each of the two Focus groups with which the student is not affiliated.

(PECOS Document, December, 1995)

As the project developed over time, the practices of establishing normative guidelines, monitoring compliance with the guidelines and evaluating how the project was progressing in its various components became an increasingly common practice at the management, and administrative levels of the project. In part, movement in this direction resulted from actions initiated by the administrative arm of the project. At other times, the move toward standardization and regulation was initiated by members of the PECOS Management Committee. In the example described here, motivation for increased regulation and standardization had arisen from demands that had emerged out of sub-components of the project and from concerns that were being expressed about the need to facilitate better relations between persons responsible for different aspects of the project at the respective universities. Finally, increased regulation and standardization of the project overtime also developed in response to the requests from the funding agent and in response to regulations and requirements established at the respective universities.

With the development and implementation of policies, guidelines, and standardized procedures for practice, the management and administration of the PECOS project were observed to become more effective, efficient, and accountable in a variety of ways. In particular, information flowing into, through, and out of the various components of the project and its surrounding environment became much more systematic, reliable, and controlled. As the administration of PECOS became more centralized and people both inside and outside of the project were provided with a central location from which to access and disseminate information. Capacities to identify problems arising within the different areas of the project and to strategically

intervene in order to reduce potentials for disrupting the overall success of the project were also significantly enhanced. Alternatively, opportunities to observe practices of communicative rationality and communicative accountability in the open and discursive space of the PECOS Management Committee became less frequent and less public. As noted above, when argumentative interactions emerged into the situation of the PECOS Management Committee meeting, members frequently resorted to a fairly standard procedural solution. The issue was removed from the broader public for deliberation among a sub-component of that public and then returned to the larger group in the form of resolutions which could be considered and decided on. As the PECOS Management Committee process was observed to become more efficient, effective, and accountable in constituting and regulating itself according to its orders and authorities, it was also becoming less discursively available and openly accountable to its publics. These observations suggested that either the public practice of communicative reason in in the project was being eroded and replaced within the project by managerial and administrative structures, or it had been displaced to another level or location within the project? To investigate this the possibility that the practice of public communicative reason had been displaced to alternative locations it was necessary to extend outward from the intersubjective domain of the PECOS Management Committee and examine the forms of communication that were being used to coordinate the practice of interdisciplinary research in other public spaces of the project.

6.2. Producing and Reproducing the Rationalities of Science

As discussed previously, the constitution and regulation of the research component of the PECOS project had been strategically differentiated out into three

semi-autonomous research foci. As analytical attention turned to a systematic investigation of the processes and procedures that were adopted to organize research practices within each of the foci, it was apparent that there were both similarities and differences in how the respective foci were constituting and regulating their intersubjective relations. These differences were observed to be related to, yet extend beyond, differences arising from the substantive research interests of the different groups.

As the field research component of this study developed, research foci three, "Health of the Land and the Biota," was observed to be constituting and regulating itself as an "aggregate" of more or less independent and autonomous research projects and researchers. Interestingly, the primary source of evidence that was available to support this conclusion was found in lack of opportunities to observe the intersubjective world of focus three over the duration of the field component of this study. In fact, the field data generated from the focus three component of the PECOS Project was limited to a total of three formal meetings that were observed and audio-taped over the duration of the field study. Other field data relevant to the focus three component of the PECOS project were obtained from observations and field notes collected while accompanying focus three researchers on a field trip to the PECOS study area. The trip had been planned by the research focus group to enable researchers to identify appropriate data collection sites within the study area. Specifically, the group had planned the trip to locate research sites that could be shared by researchers working on different research projects. Sharing research and data collection sites in the field had been identified by the researchers in focus three as a concrete strategy for realizing the broader goal of

interdisciplinarity.

The lack of opportunities to observe the intersubjective world of the focus three group suggested that the management committee members who were acting as co-chairs for the focus group were also acting as the cognitive and instrumental rational conscience for the group. Evidence supporting this hypothesis emerged toward the end of the field research component of this study. As student research projects were nearing completion in PECOS Project , the co-chairs of the focus three group expressed increasing concern about how the products emerging from the different foci and projects were to be integrated into a final product that would meet the interdisciplinary requirements of the Pecos Project. The strategy that the co-chairs settled on and presented to the PECOS Management Committee was essentially a mode of cognitive-instrumental integration. Specifically, it was decided among the co-chairs that a portion of the group's research funds would be re-allocated from student stipends to employ a post doctoral fellow to integrate and disseminate findings from the various sub-components of the research project. In the call for applicants it was stated that:

> PECOS requires the assistance of a committed and cooperative individual to help integrate themes arising from a "problem-based" research approach. Diverse tasks include organizing of workshops, gathering background information from a variety of sources and preparing manuscripts or other avenues for sharing information in a community-based research setting.
>
> (PECOS Document, July, 1996)

Further evidence in support of the hypothesis that focus three was adopting an

instrumental mode of integration was found in an examination of the intersubjective communications of the group. When the data that had been generated from the social context of focus three meetings were examined, the content of the discussions was found to be primarily pragmatic in orientation. Specifically, communications among the researchers tended to focus on strategies and mechanisms for recruiting students, strategies and mechanisms for allocating and controlling resources for individual projects, and strategies for sharing "tool boxes", instruments, techniques, data, research field sites, travel and accommodation arrangements, and so on. With the exception of a portion of discussion during the first meeting of the group that followed the notice of the award, the meaning and value of interdisciplinary inquiry, conduct, and process was not explicitly thematized and introduced into their discussions as a focus of deliberation or argumentation. Similarly, the policy relevance implications of the research, although acknowledged in discussions, were not observed to emerge as an explicit focus of deliberation or argumentation among the members of the focus three group. When these issues were introduced into discussion at meetings, it was the co-chairs of the research foci who explicitly thematized the issues and invited commentary from the participants. The commentary that was elicited in these situations tended not to escalate into an extended debate on the moral-practical dimensions of the issues raised. Rather, discussion tended to focus on devising strategies and methods for integrating the research products coming out of the individual projects in the research focus and contemplating methods for communicating and transmitting the results to the relevant users.

At the same time that the field study observations were indicating a relative lack

of interest in debating the broader issues arising from interdisciplinarity and policy relevant research among the focus three researchers, it was observed that there seemed to be a pre-existing network of social and working relations among several of the individuals who constituted the group. Although focus three was the largest of the research foci in terms of overall researcher membership, from the outset of the project it was a research focus group in which many of the members of the group were clearly acquainted with each other or were aware of the work that others were doing in their respective fields of specialization. From these observations, it was deduced that the intersubjective world of the focus three group was part of the taken for granted assumptions of the various participants in the focus group. As part of the taken for granted assumptions of the participants, the need to explicitly constitute and organize their intersubjective world was not perceived to be a generalizable need or interest for the group in realizing the broader goals of the research project.

Another interesting feature to emerge from observations of the focus three group arose in relation to the attitudes that researchers expressed about entry into the study area and the means for establishing conditions to realize the research objectives of the individuals and the focus group more generally. For the most part, the practice of going out into the community and doing field research with the residents of the community wasn't thematized as an issue for extended deliberation or argumentation. What was thematized as problematic about the conduct of inquiry in the field were the objective contingencies of the natural environment and the need to strategically orchestrate the various projects so as to manage and adapt to those contingencies. A foremost concern among focus three researchers, was recognition of the fact that a failure to time and

orchestrate several of the field studies in accordance with the contingencies of the environment would mean that the research interests of an entire project may need to be put off until the following season. Concerns about interacting with the residents of the community and establishing intersubjective relationships with the residents in order to carry out the research were conspicuous by their absence. In fact, discussions about how to contact study area residents and obtain permission to carry out research on the land were portrayed by these researchers as fairly regularized and taken for granted practices that they encountered as a matter of routine in their everyday research experiences.

While the practice of instrumental reason was clearly evident in the interactions among members of the group, the practice of communicative reason was not observed to be a feature in the public spaces which were constituted and regulated by the focus three researchers. As noted, discussions in the public spaces specific to the group tended to be oriented to thematizing problems of technique, strategy, organization, and calculation relevant to getting the data required to meet the research interests needs and interests of the group. One obvious rationale for the position taken by researchers in focus three was a generally recognized need in PECOS to ensure that students were able to complete the requirements of their respective programs in a reasonable time frame. A second concern that focus three researchers shared with other participants in the PECOS project was a generally recognized need to create conditions conducive to meeting the ongoing research interests and professional obligations of the faculty who were participating in the project. The existence of these shared concerns, however, did not seem to account for the differences that were observed to emerge between the

research focus three group and the practices that were observed in the research focus one and two components of the PECOS project. One possible explanation for the observed differences was found in the relatively high level of agreement on the factual and normative aspects of the interdisciplinary research process that seemed to exist among the researchers in their public communications. As noted previously, the normative regulation of the intersubjective world of the focus three group was not observed to emerge as a focus of explicit discussion in their public communications. The relative absence of these types of discussions in the data that was generated was interpreted to mean that either the individuals didn't perceive either a need or interest to realize consensus or mutual understanding among themselves about the practice and process of interdisciplinary inquiry; or consensus and mutual understanding about the practice and process of interdisciplinary inquiry and conduct was a pre-existing condition within the group. Overall, participation in interdisciplinary and policy relevant research seemed to be accepted by the participants as the objective reality that the research faculty and their respective students happened to be living with, experiencing and managing at the moment.

When relations between focus three and the other research foci were examined, a basis of evidence for the latter interpretation of the situation emerged. In particular, members of the focus three group were observed to identify more explicitly with the researchers and research interests within the Focus Two, "Environmental Pesticide Exposure and Human Health" component of PECOS, than was apparent in their interactions with the researchers and research interests within the Focus One, "Land Use Patterns and the Structure of Rural Communities." In fact, several of the PECOS

participants who were primarily integrated into the PECOS project through the focus three research group, were also affiliated with the focus two research group on particular projects (see Appendix III). Alternatively, focus three researchers tended to express relative ambivalence about how their research interests might be integrated with the research interests of the focus one group. This ambivalence was clearly evident in from observations of the process of developing and refining the Common Survey Instrument for the PECOS Project. In the PECOS research proposal, the Common Survey Instrument had been identified as one of the primary tasks and responsibilities of the focus one group. At the outset of the project, this instrument had been identified and conceptualized by members of the management committee as a task and product which was to serve as a "public utility" within the PECOS project. As such, it was decided that participation from all research groups in the development and administration of the instrument was important for achieving the overall objectives. However, when the focus one group extended an invitation to focus three members to generate and contribute questions for the instrument the response was essentially a non-response. Rather than viewing the members of their group as having a vested interest in producing questions for inclusion on the survey platform, the group expressed the view that they saw their primary role in the process as more advisory and editorial as opposed to generative. As the survey process developed over time, the focus three representatives who sat on the PECOS Data Collection and Sampling Committee participated regularly and consistently in the meetings that were convened. As the group had indicated at the outset, however, the roles assumed by the participants in these meetings were primarily advisory and editorial. Overall, they were observed to act on

their initial inclinations that the Common Survey Instrument was external to their explicit research objectives and fields of theoretical and methodological knowledge.

While the public constitution and regulation of an intersubjective world in the focus three research group was difficult to observe, the focus two research group presented an opposite state of affairs. Throughout the data collection time frame for this study, the focus two research group was a "beehive" of meeting, planning, deliberating and carrying out tasks related to the interdisciplinary research interests of the group. During the more intense periods of instrument development, data collection, and production of final products, it was not unusual for the focus two group to convene meetings at least once every two weeks and more frequently if members of the group deemed it necessary. Overall, the constitution of an orderly, regularized and public intersubjective world for participants in the focus two component appeared to be a recognized need and generalized value for the members of the group from the outset of the PECOS study.

The value that members of the focus two group placed on the constitution and regulation of an orderly intersubjective domain was clearly expressed in the consistency with which they practiced pre-established "rules of order". Agendas were regularly prepared and circulated prior to the meetings, participant lists were consistently reviewed and up dated, and the regular participation of members was a general expectation, as well as a relatively consistent practice for members of the group. A quasi-formal rotation of responsibility for recording minutes was established and institutionalized early in the project, and the format for recording minutes was standardized to ensure their efficiency and effectiveness as a record of the meeting and

as a vehicle for communicating information and decisions coming out of the meetings. From the outset there appeared to be a shared pre-understanding of a relatively common set of procedural rules which guided the conduct of inquiry and practice within the group. In this respect, the focus two group presented itself as somewhat of an anomaly when compared to the apparent lack of formal order that was being observed in other sites of the PECOS project.

The practice of explicitly recognizing the legitimate social orders of the group was also a feature that was prominent within the intersubjective world of the focus two group. In fact, as the field component of this study progressed, this particular convention emerged into the intersubjective world of focus two as a contested validity claim. The situation arose when one of the collaborators, who had joined the group as an adjunct faculty member, explicitly challenged the normative appropriateness of using formal titles to refer to, or recognize, persons who occupied a professional status within the group. The individual expressed the view that deferring to formal titles and positions was normatively inappropriate in the context of a group which claimed to be interested in breaking down social structural barriers between the knowledge of "experts" and the "expert" knowledge of persons outside of the academic and professional communities. Several of the members of the group responded to the claim with an expression of dismay that the issue was being raised as a point of discussion. They did not attribute their dismay, however, to a disagreement with the claim that the individual was making. Rather, several of the members who spoke to the issue explained that they had engaged in the practice without being consciously aware of the fact that they were doing it. Once the practice, and its normative inappropriateness had

been thematized, members of the group agreed that there was a need to consciously change the practice and refer to all members by their first name. Agreeing to change the practice and actually changing the practice was observed to be easier said than done. As the intersubjective world of focus two developed over time, several of the members of the group acknowledged that "old habits die hard." Despite consistent efforts on the part of members to change their practice, several individuals inadvertently reverted to the convention. When slips occurred in the communications of the group, recognizing and correcting the violation of the group's normative position on the issue became a regular and accepted practice in the intersubjective context of focus two.

The positive value that was placed on the adoption of established principles and practices of rational organization was also expressed in the individual members' identification with the orders and procedures of their scientific discipline as a guide to developing interdisciplinary research practices and procedures. Although individuals expressed an identification with the scientific practices and procedures of their own discipline they did not seem to be inhibited in their capacity, or willingness, to discuss and explore the alternative perspectives, practices, and procedures used by other disciplines within the broader domain of science. This aspect of the intersubjective world of focus two was clearly evident in the communications that transpired during the group's efforts to develop the survey instruments required for the focus two field research component. During the process of developing those instruments, the group frequently engaged in lengthy discussions, deliberations, and argumentations on the scientific validity of the different methods that individual researchers were proposing for data collection within the group. The overall social effect of these deliberations on

the practices of others within the group was difficult to ascertain. While the participants in the communications seemed to be motivated and comfortable with expressing their criticisms of the scientific validity of different methods for data collection from their own standpoint, it was generally acknowledged that an individual researcher was justified in using the method if it was an accepted and defensible method within the parameters of their field of specialization. In fact, it was explicitly recognized in their communications that rejection or dismissal of the methods and knowledge base of a discipline outside of one's own field of expertise would be a normative violation of the collegial principles that have been institutionalized within the academic community. From these observations, it became increasingly apparent that the individuals who were participating in the intersubjective world of focus two were drawing, and drawing upon, their capacities to distinguish between truth validity claims and normative validity claims as a means to constitute and regulate their collaborative relations. As the practice of distinguishing between different types of validity claims was systematically investigated, indicators emerged to suggest that the group was also drawing distinctions between claims to normative validity and claims to authenticity.

Recognition of the subjectivities participating in the intersubjective world of focus group two was a prominent theme in focus two deliberations. As they worked at defining their situation and deliberated on various strategies to achieve their research objectives, the group frequently engaged in discussions about how they felt about how they were constituting and regulating themselves as a team of interdisciplinary scientists. These discussions were manifest in reflections on how they understood themselves as members of a team of collaborating researchers, how they understood

their common identity as members of the focus two group, and how they understood relations between the focus two group and other components of the PECOS project. In these discussions, the need to build and maintain trusts among the members of the group and the importance of respecting the status and identity of the different individuals and the different perspectives that were available within the group were frequently thematized. Focusing on learning about and learning to control subjectivities in their deliberations as a group was found to be one of the primary procedures that focus two used to reconcile tensions arising from differences in the normative orders for doing science as well as those arising from differences in the normative orders for constituting an organization. It is important to acknowledge, however, that these deliberations and argumentations were not always successful. Moreover, when deliberative and argumentative procedures failed, the group was observed to resort to alternative procedures to manage or defuse tension.

In one instance, a conflict between the group and individual researchers responsible for a particular project within the group emerged and was constructed as a potential violation of the contractual agreement that had been established between the individual project and the more general research interests of the focus group. In this disputation, deliberation and argumentation within the group did not translate into a satisfactory resolution of the disputed validity claims. Ultimately, the situation was adjudicated and a resolution was achieved by introducing a "mediator" into the situation from a source originating elsewhere in the PECOS Project. The resolution that did emerge was a decision to dissolve the relationship and relocate the particular research project elsewhere within PECOS Project. Overall, the intersubjective domain of the

focus two group was observed to be a social situation in which the participants were adept at using their strategic and communicative know how to constitute and regulate a collective capacity to realize the broader objectives of the research component.

The Focus One, "Land Use Patterns and the Structure of Rural Communities" group presented a model for constituting and regulating interdisciplinary inquiry and conduct that exhibited several similarities to the pragmatic approach to research that was observed in the focus three group. At the same time, similarities to the development of an organizational capacity for interdisciplinarity which were being observed in the focus two group were also observed to emerge within the context of the focus one group. There were also a number of notable differences between the observations emerging from this component of the field research study and those which were emerging from the other components.

One of the notable contingencies of the focus one component of the project was the emergence of an explicit fracture in the group at a relatively early phase in the development of the overall project. Given this fracture, the point of departure for addressing the research tasks and objectives that had been set out in the original proposal was appropriately described as a "House Divided." The reasons why the fracture occurred are difficult to ascertain with certainty and were likely related to a convergence of intersubjective and subjective contingencies. It is interesting to note, however, that historical commentaries on the social sciences have frequently alluded to their process of development as the development of a "House Divided". Consequently, it is reasonable to speculate that there may have been objective forces which contributed to the fracture as well. The fact that the fracture did occur and that it tended to be

reconciled within the group and the project more generally, as a situation in which the "subjects had agreed to disagree," seemed to fit with the more general atmosphere of voluntarisim that was observed to characterize the intersubjective world of the focus one group. Alternatively, it could be argued that the fracture was one of the reasons that an atmosphere of voluntarism was observed to emerge as a characteristic of the group. One of the social effects of the fracture had been a reduction in the overall diversity of scientific and departmental perspectives that were available within the intersubjective world of the group. Consequently, the capacity for the group to develop as a relatively voluntary association of researchers and colleagues may have resulted from the pre-existence of a relatively high level of agreement as to the appropriate standards and procedures for realizing the research tasks and objectives within the group. As the field component of this study proceeded, there was some evidence to support the validity of this latter interpretation of the situation.

The individuals who remained within the original focus one structure were observed to develop into a reasonably cohesive unit of individuals who collaborated amicably in working toward the pragmatic realization of the specific goals, tasks, and products that had been identified in the original proposal. At the same time that they attended to realizing the interests of the group, they were observed to be quite open and vocal about the fact that their collaboration with others in the group was a strategic means to realize their own particular needs and interests. Using the intersubjective world of focus one as a means to realize particular needs and interests seemed to accepted as a normatively valid position for members to take within the overall process.

Interest in constituting and systematically regulating the formal orders of their intersubjective world was found to be a practice that was moderately adhered to. Regular meetings were held and the duration and frequency of these meetings tended to vary with the particular tasks which were emerging on the research agenda of the group. For example, during the process of developing the common survey instrument for the project, meetings were frequent and reasonably lengthy in duration. At the same time, the frequency and intensity of the participation of particular individuals in the overall process was observed to be variable. There tended to be a core group of research faculty and student participants who consistently attended and participated in these meetings and a somewhat smaller group of research faculty and students who attended on a more irregular basis. Also, it was observed that during the process of developing the survey instrument, the members of the group seemed to be quite agreeable to working autonomously on the tasks related to their particular research projects and then bringing the results of those labours to the group for discussion and possible integration into the common survey platform that was developing. It was seldom that the group was observed to actually generate questions for the survey through processes of communication within the group meetings as was observed to be the case in the focus two situation. Rather, the intersubjective communications were oriented to refining questions and negotiating the processes and procedures for determining which questions could be included and which questions were candidates for exclusion. On a more general level, the agendas for the meetings were usually established and circulated prior to meetings and minutes of the meetings were recorded and produced by a volunteer who was recruited during the meeting. Overall, adherence to standard rules of order

was evident within the group, however, those orders were subject to interpretation within the context and were not stringently enforced.

One of the more interesting observations to emerge from the data that were generated within the focus one setting of the PECOS project was that, from the perspective of this research study, it wasn't perceived to be very remarkable in its development or process over the duration of the field research component of the study. One of the primary reasons for not perceiving anything very remarkable about the intersubjective world of the focus one group may have arisen from the structural relationship of this field research study to the focus one group. By design, the focus one group was the research focus that provided a structural location for this study within the broader context of the PECOS project. Further, many of the members who constituted the focus one group were individuals who occupied the same disciplinary location and perspective that established the foundation and provided the theoretical and methodological framework for designing and carrying out this particular study. Given these conditions, the capacity to adopt an external perspective and view the social interactions and social relationships that were transpiring and emerging in the intersubjective world of the focus group as problematic was experienced as a problem. In this particular situation, much of what happened appeared to be very natural, normal, and part of the everyday world. Given this situation, it must be acknowledged that the pre-existence of an insider perspective in relation to the focus one group most likely operated to impede and limit the extent to which an external perspective necessary for critically reflecting on the processes of the group could be, and was, realized.

As suggested at the outset of this discussion, both similarity and difference in

the processes and procedures operating across the research foci were observed. In those situations where social interactions among the researchers were most frequent and intense, patterns of both consensus and conflict were observed to varying degrees within the respective groups. It was also found that there were various methods for resolving conflicts and realizing a degree of agreement on specific issues both within and between the respective groups. At times these resolutions were achieved by resorting to pre-existing standards and rules of order that were understood to be institutionalized within the more general context of the scientific community, the university, and the policies and procedures that were adopted within the PECOS project. In other words, the adoption of instrumental, purposive and normative standards that were known in common to the members of the research foci was observed to be a force that was operating within all of the research foci. At other times, and to varying degrees within the particular groups, the procedures for determining ends and identifying the means to pursue those ends were constituted out of the intersubjective world of the group through processes of deliberation and argumentation oriented to realizing mutual understanding on contested validity claims. The fact that these processes seemed to be most frequently observed within the focus two research group suggested that practicing communicative reason in the public spaces of PECOS was related to a combination of conditions. In particular, it seemed to be related to the frequency of interaction among participants and to the diversity of interests and perspectives that the participants brought to the collective deliberations of the group.

Attending to some of the more explicit differences across the groups, there did seem to be some indication of the emergence of two somewhat different models of

interdisciplinary inquiry at the research focus level of the overall project. On the one hand, focus three and focus one seemed to be more or less inclined to take their intersubjective worlds for granted and to use them in an instrumental rational manner as a means to realize the goals of the group and the interests of individuals within the group. Focus two, on the other hand, appeared to be devoting a significant amount of time to constituting and regulating their intersubjective world as a goal and as a means to get on with the tasks of the project. Given this latter situation, the practice of critical argumentation was observed to occur more consistently in the public space of the Focus two group than in the public spaces of the other groups. Frequently, the practice of communicative rationality was the primary means that the focus two group used to resolve the validity claims that were being thematized and contested in their intersubjective world. At other times, for apparently instrumental and strategic reasons, the practice of argumentation would be cut off and a strategic or standardized procedure would be adopted in order to get on with the task at hand.

At the macro-level of the PECOS project, aspects of both instrumental purposive rational action and communicative rational action were found to be operating in the public spaces of the PECOS Management Committee and in the public spaces of of the respective research foci. The practice of these different forms of rationality within the various intersubjective worlds that constituted the project were observed to vary with a number of contingencies that were available within the social situation. For example, the actual practice of communicative rationality was observed to vary with the substance and type of validity claims that were being contested, the anticipated implications of the outcomes of particular decisions for particular and general interests

within the group, and a variety of structural conditions. The structural conditions conducive to the practice of communicative rationality were a relatively high degree of diversity of intellectual perspective among the participants, a reasonable symmetry of social position and status, and the availability of an allotment of time to allow the deliberations and argumentations to actually occur. Overall, however, there were indicators in the field data to suggest that there was a tendency for the practice of communicative reason to be displaced or replaced by the practice of instrumental or purposive rational action as the project developed over time. This tendency was found to be particularly evident at the level of the PECOS Management Committee.

Given this general finding, a decision was made to extend out further into other areas of the project to determine if there were locations where the practice of communicative reason was being retained as a primary process and procedure for advancing, contesting, and evaluating the various validity claims which were circulating in the project and contributing to its constitution and regulation over time.

6.3. Reconstituting "The Public Sphere" of the Association

A general interest in constituting and regulating a PECOS Interdisciplinary Seminar Series was identified as a particular goal early in the project. In fact, the idea of an interdisciplinary seminar series had been included in the original project proposal as a strategy to enable and facilitate intellectual integration within PECOS. In the revised research strategy the idea of the seminar series had been retained and re-emphasized as one of the primary strategies to be used to realize intellectual integration. As the project moved into its operational phase, the seminar was thematized as an action that should be implemented "sooner rather than later" since it was viewed as a

means to "kick start" the project and the interdisciplinary process. Although the initial intention had been to convene the seminar approximately once every two weeks, a few weeks into the project it was decided that it would be more appropriate to hold weekly seminars throughout the duration of the project. One of the reasons for the increased frequency was a decision to encourage PECOS students to use the seminar as an opportunity to present and receive feedback on their research proposals at an early stage in the process. Holding seminars on a weekly basis was also related to the decision to invite speakers from a broad spectrum of perspectives and knowledge bases that were perceived to be relevant to the general interests of the project. Included in this decision was an interest in encouraging residents from the study community to participate as both speakers and members of the audience. Given the emphasis that was placed on the seminar as a means of integration, and the diversity of participation that was anticipated in the social context of the seminar, the PECSO Interdisciplinary Seminar was identified as a useful location to look for the practice of communicative reason within the project, and the university more generally.

6.3.1. The Seminar: "The University's Dialogical Universal"

The first seminar in the PECOS Interdisciplinary Seminar Series was organized as a means to formally announce the success of the PECOS proposal in the Tri-Council Eco-Research Program grant competition and to enable a discussion with the study participants about where the project was, and where it could and should be going as it developed into the future. It was a seminar that had broad participation, with substantial attendance by faculty researchers who were involved with PECOS as well as several of the graduate students who were interested in becoming affiliated with the PECOS

project. The overall attendance at the seminar was estimated to be approximately 30, to 35 university research faculty and graduate students.

The seminar opened with two brief presentations from selected members of the PECOS Management Committee (i.e., the chair of the PECOS Management Committee and one of the chairs from the three research foci). Substantively, the presentations focused on the goals and objectives of the project, the status of funding available to the project, and revisions that had been implemented to comply with the budget reduction that had been imposed by the Tri-Council. Following the presentations, members of the audience were invited to comment or pose questions to the speakers and other members of the PECOS Management Committee who were present in the audience. It was interesting to observe how quickly the social situation was redefined from a monological relation of communicating to the audience, into a dialogical relationship of communicating with the audience. The members of the audience, both student and faculty, were observed to be very comfortable with asking pointed questions of the members of the PECOS Management Committee, advancing their own ideas about how the project could and should develop, and expressing their various opinions and convictions about the merits and demerits of interdisciplinary, policy relevant research and the issue of sustainable development. Within a period of approximately 60 minutes, a group of relatively diverse individuals, many of whom were complete strangers, had formed themselves into a deliberating public that exhibited practices similar to those which had been observed in the early deliberations of the PECOS Management Committee. While the primary motivation for holding the seminar had been to transmit and disseminate information about the project to persons who were

already involved or interested in becoming involved in the project, the situation had transformed itself into something more than that. This early observation seemed to confirm the initial speculation that the seminar warranted a more systematic investigation as a public space in which the practice of communicative reason may be a primary means for constituting and regulating the practice of interdisciplinary science within the university.

This hypothesis was investigated by scanning the PECOS seminar transcripts and related documents which were collected over the duration of the field study component. The primary purpose for the investigation was to attempt to determine how participants in the seminar series understood the social setting of the university seminar and to observe how they actually behaved in that setting.

In October, 1994, shortly after the PECOS Interdisciplinary Seminar Series had been launched, the PECOS Management Committee extended an invitation to the Dean of the College of Graduate Studies at the University of Saskatchewan to give a seminar to the research faculty and students who were participating in the PECOS research project. In accepting that invitation, the Dean chose to present a historical overview of the development of the concept and practice of interdisciplinary studies at the University of Saskatchewan. While the substantive focus of the seminar was clearly relevant to the interests of PECOS and to the interests of this research study, the procedure that was used to communicate the substantive content of the seminar was of particular interest for the purposes of this study.

The seminar opened very conventionally with the chair of the seminar introducing the speaker to the audience. In this particular case, that task was assumed

by the chair of the PECOS Project. The introduction that was provided also followed a very standard and conventional procedure. The chair provided a brief biography of the speaker which highlighted her/his status and position within the academic community, drawing particular attention to the speaker's accomplishments which were considered most relevant to the situation. An explicit emphasis was placed on the role that the speaker had played in facilitating PECOS' efforts to integrate into the academic and administrative structure of the University of Saskatchewan. When the speaker's chair was turned over to the Dean, the Dean opened the seminar presentation with an overview of the substance and goal of the seminar presentation as well as a description of the form of interaction that the audience could anticipate within the context of the seminar:

> ...this is what I would like to do today. ...I would like to take, I'm just going to talk about interdisciplinarity and this institution and about what interdisciplinary research and studies and programs are all about. So I would like to take a quick look at the past. I will take a longer look at the challenge of the present. **And then I hope, you're welcome at any point to stop me and I consider this a seminar, so stop me at any time, but if nobody stops the dialogue until the end, I hope that we can move past through present into an open discussion of what the future looks like for you, your studies, your research.**
>
> (PECOS Transcript, October, 1994).

The highlighted section in the segment that has been extracted from the transcript is notable in that the public space of the seminar was explicitly thematized, and the speaker's understanding of the normative structure of the seminar was articulated to the audience. Essentially, the Dean identified the normative structure of the seminar as a

dialogical public space in the university where social relationships are established between a speaker and his/her interlocutors for the purpose of engaging in a process of deliberation that is also a process of collective interpretation and learning. Implicit in the Dean's comments was a description of the university seminar as a social condition of general symmetry where persons were free to reflect on, and speculate about, items of common interest.

In this particular situation, the dialogical relationship which the Dean had described was not actually constituted until the presentation was concluded and a second invitation was extended to members of the audience to establish a dialogical relationship with the speaker and with the content that had been thematized in the presentation. When extending the second invitation, the Dean's understanding of the normative structure of the seminar as a dialogical process was reaffirmed:

> ...and I would just like now to hear from you **and because a seminar is supposed to be a dialogue, not a monologue, ahh, where you're going to go with this.** And to ask you if you have any questions on what I've just said.
>
> (PECOS Transcript, October, 1994).

By re-emphasizing the normative structure of the seminar situation, the speaker also acknowledged that the information, opinions, and validity claims that had constituted the substance of the presentation had entered into the public space of the intersubjective world of the seminar where they were available for use by the participants for a variety of individual, and general interests. In this situation, the information, opinions and validity claims that had actually been advanced by the speaker were used to thematize

and articulate a variety of subjective opinions and validity claims that were held by the members of the seminar audience and that transcended the parameters of the PECOS seminar and the University of Saskatchewan. In fact, in the dialogue that emerged into the situation there was little, if any, reference to the truth validity of the claims that the speaker had made about the history of interdisciplinarity at the University of Saskatchewan or about comments made in reference to the academic and administrative structures which were perceived to facilitate or hinder the practice of interdisciplinary inquiry and conduct within the University of Saskatchewan. Rather, the seminar developed and proceeded as a collective critical reflection on the meaning and value of interdisciplinary practice for individuals, for universities, for disciplines, and for society in general. Excerpts from the transcript of the seminar are reproduced below to highlight the validity claims that were thematized in the dialogical relationship that emerged in this situation:

Example 6.1

Contesting the Normative Validity of Challenges to the Validity Claims of Interdisciplinarity

> ...they said that ahm, people who go into interdisciplinary areas are not necessarily going to cease to be specialists in particular things but that's why it's so important at the level of graduate studies which, and this of course is a two way process. Is the context in which you do your study. That you're a specialist in some areas within Biology but it's within the context of a broader scope which you don't get if you stick in an area of a discipline. So I think that a lot of people that fear the loss of rigor or that sort of thing are, well they shouldn't fear that. I mean there may be some people who may be more generalist but that is the case in any discipline. I mean there are people in biology who are generalists and people who are narrow specialists and there is a place for both. So I think that in an interdisciplinary program...[it] will have a lot of specialists but I think the point, what will come out of it in terms of the students who work through this

will be a scope and understanding of how to cross disciplines as the need arises, or as the opportunities occur.

Example 6.2

Contesting the Normative Validity of Generalized Standards of Academic Knowledge

...I also rather wonder if perhaps various definitions of specialist, or specialization are possible. At the present time we continue in all universities to have a very strong disciplinary tradition and in each of those traditions we know already what it means to specialize. It means probably to go in a fairly narrow field and go in depth. Have a very, very specific and rigorous methodology to examine at the doctoral level or in faculty members' research, to examine something...a fairly narrow range of something. But I wonder if we might not reconsider that definition and say that that's one way to view specialization but there are other kinds of specialization that can come and be equally rigorous that don't meet the standards of specialization in any particular discipline but are equally, ahm, important in terms of establishing a knowledge base and meet other criteria such as duplicability and ahh, significance generally....

Example 6.3

Thematizing Inclusiveness as a Normative Condition of Interdisciplinarity

...It seems to me what we need to think about is a methodology for gathering this kind of information from lots of different sources and putting it all together where it isn't just biology and chemistry and politics and that together but it is a kind of truly meta-disciplinary way of looking at the world. And I don't know what the answer to that is.

Example 6.4

Thematizing Exclusiveness as a Normative Condition of Disciplinarity

...if one follows absolutely the logic of the traditional disciplines is that one has to carefully construct the horizon of the research project. And one says, okay, I'm going to study this and I'm going

to come up with a hypothesis and here are the factors that I'm going to consider. And there may be other factors but they are not relevant to my study. And so the social factors, the environmental factors, the ethical factors ahh, scientific research for a long time...ahh, I suppose the banal example of it is the example of those who made the atomic bomb. Who simply discover a way to do it and did not wish to be asked the question, what are the ethical implications or what are the possible applications of this. This is a scientific discovery and that's where it is. Uhm, and of course in any scientific research you always have to establish your limits because you can't consider everything. But I think interdisciplinarity allows you to address some of the issues that traditionally have been excluded from the ahh, academic disciplines as they have been set up.

Example 6.5

Thematizing the Exclusiveness of the System

...I'm worried about [interdisciplinarity] in the sense that a lot of people are of that [opinion] that a PhD product out of an interdisciplinary program is virtually unemployable because of the existing system. ...So we are producing people in an interdisciplinary program who don't have the specific strength in a sub-discipline to fill any of those slots in the academic world and yet that's not likely to change in the foreseeable future. So in a sense, ahh, we are creating with all the best intentions people who will be virtually unemployable within the existing system. And is that fair to encourage students to do that when it's going to block off one of their major sources of employment in the future.

Example 6.6

Thematizing the Needs of Systems

...I think what I've seen of university systems is that the universities are starting to recognize that they need these interdisciplinary people on staff and they're actually not only looking for grad students with the interdisciplinary background, but the very background so that they can make use especially of the granting system

Example 6.7

Thematizing Practical Prudence as a Condition of Social Change

> ...I'm one of those persons that actually ahh, have counseled prudence to graduate students in this regard for exactly the reasons pointed out. That ahh, at least within the university the departmental program, disciplined degrees are recognized. People know what those are. We're not quite sure what an interdisciplinary degree would be. But in this transitory kind of period it's probably not a disadvantage to have a discipline degree with some indication of interdisciplinary experience and expertise. Uhm, I do think we're in some kind of transformation. The development of the university clearly reflects a sequence of historical events. And the structure of the departments and its organization are a reflection of that. It seems to me quite clear there's a number of forces, both inside the university and clearly outside, our council being a prime example, which are pushing very hard and very successfully for some reconsideration of how we do what we do in that area of acquiring and disseminating knowledge. And I suspect what will happen over some unspecified period of time is that ahh, programmatic, ahh, organization within the university will be much more normal. And it will probably have an interdisciplinary character to it.

These several examples of commentary which emerged into the seminar setting have been extracted from that context and reproduced here for a number of reasons. Superficially, the selection of examples provide insight into the diversity of thinking about the theory and practice of interdisciplinarity that exists among university researchers who are doing and planning to do interdisciplinarity. More specifically, they provide insight into people's subjective opinions and positions relevant to the intellectual, methodological, and practical dimensions of interdisciplinary inquiry and conduct in the contemporary context. At another level, the subjects who voiced their opinions, positions, and concerns about interdisciplinarity, were participating in and at

the same time constituting and regulating a dialogical social relationship among autonomous individuals who shared a common interest. Within the parameters established by those dialogical relationships, they were creating and facilitating public spaces for advancing, contesting, and potentially realizing a mutual understanding on a variety of factual and normative validity claims relevant to various levels, dimensions, and aspects of interdisciplinary theory and practice within the university sector. At the conclusion of the seminar there was no visible or concrete evidence to suggest that a mutual understanding among the participants had been achieved or that any of the subjective positions on the objectivity of interdisciplinarity had been confirmed, altered or transformed. Rather, closure was brought to the discussion with the announcement that the time allotted for the seminar had been used, the speaker was thanked for the seminar presentation, and the audience dispersed.

As the PECOS seminar series developed over time, the process of constituting, regulating, and dissolving the universal audience of PECOS as a means to advance, challenge, and evaluate validity claims in a context of collective interpretation was observed repeatedly. In some cases, seminar speakers provided presentations which were very particular, very specialized, and very monological in both form and social effect. That is, the seminar was constituted and regulated as a process in which the speaker used the setting to communicate his or her competence in a particular subject area to the people who were present in the audience. In those situations, the question and response interactions within the situation tended to be constituted in the form of a limited dialogical relationship between and among persons who shared common knowledges and common interests. For example, there were several instances in which

members of the audience used the invitation to pose questions as an opportunity to communicate their own competence in a particular subject area by challenging, affirming or elaborating particular validity claims advanced by the speaker with comments drawn from their own experiences and perspectives. At other times, the seminar setting was observed to develop into a more universal dialogical social relationship among the various individuals who were in attendance and across the variety of validity claims that had entered into the situation. For example, instead of following the more conventional format of a presentation, followed by a period of question and response between a speaker and a member of the audience who shared a common understanding in a specialized subject area, the setting developed into a more inclusive and critical deliberation or argumentation among a variety of participants who shared a common interest in a common problem from a variety of different perspectives and understandings. In these situations, the conventional orders of the seminar were observed to dissolve somewhat and the boundaries between speaker and listener became increasingly interchangeable. In both situations, however, the process and procedure of the dialogue was one in which speakers and listeners were observed to hold one another accountable for the various validity claims that they were advancing and seeking to confirm, challenge or evaluate. At the same time that the individuals engaged in processes of challenging, contesting, and evaluating the validity claims of others they were observed to demonstrate their rational capacity to practice autonomy in the public space of the seminar by giving and recognizing reasons for accepting or rejecting particular validity claims. In fact, as observations of the seminar series proceeded, two normative validity claims were found to be particularly salient among the participants.

Firstly, there was an unspoken and shared normative expectation that persons in the seminar situation would be rationally disposed to challenge and hold others accountable for the validity claims that were thematized in the public space of the seminar. Secondly, there was an unspoken and shared normative expectation that persons in the situation would be rationally disposed to provide reasons for advancing, accepting or challenging the particular validity claims that were being thematized. The salience of this normative feature of the seminar situation was most apparent when speakers or members of the audience interpreted the actions of particular individuals as approaching a violation of the pre-understanding of the normative structure of the seminar. That is, when individuals appeared to be transgressing the limits of rational discourse that was expected in the seminar situation by refusing to give reasons for their actions or refusing to listen to reasons for pursuing alternative courses of action . The remarkable consistency of these observations over the duration of the case study of PECOS suggested that the dialogical normative structure of the university seminar is a critical public space within the university where the facticity and normativity of university learning processes converge. In other words, the normative structure of the university seminar was observed to function as both the "ideal" and the "real" institutional core of the lifeworld of the university in society. Given this observation, it was reasoned that if the seminar was in fact constituting and regulating itself as the lifeworld of PECOS, then it would be reasonable to expect that aspects of the structure and process of the seminar should be visible in other locations of the project. As other locations within the PECOS Project were systematically examined as a means to test this hypothesis two interesting findings emerged. Firstly, it was found that there was ample empirical

evidence to support the notion that the substantive content of the seminars did not remain encapsulated within that domain. On numerous occasions, the ideas and claims that were introduced into the public sphere of the PECOS project within the context of a particular seminar were subsequently observed to emerge into the conversations, deliberations, and argumentations that were occurring in the other locations of the project. In these other locations, it was also observed that the ideas, as they permeated into other areas of the project, were being subjected to an ongoing and generalizing process of validity checks through processes of deliberation and argumentation. At other times, ideas which were circulating in the other locations of the project were explicitly brought into the seminar situation by individuals or groups for validity checks by the participants in the seminar. One explicit example of this was the practice of encouraging students to present their thesis proposals to the interdisciplinary audience that was constituted at the weekly seminar series. This practice provided PECOS graduate students with opportunities to receive critical commentary and feedback from a range of perspectives and standpoints at an early stage in the development of their research projects. As the students' projects developed over the duration of their time in the program, particular insights and evaluations emerging within the context of the seminar were available for consideration and potential incorporation into the design of the students' research and the theses that were eventually produced. That this was occurring was evident in the deliberations at student meetings and in the students' informal conversations about how their projects were developing and transforming at the theoretical, methodological, and substantive levels of the research.

6.4. Summary: Extending the University's Dialogical Universal

As the project progressed, the integrative capacity that was associated with, and experienced in, the seminar situation became an increasingly visible aspect of the PECOS project. For example, as the field component of this study was drawing to a close, the PECOS Interdisciplinary Seminar Series was identified as an appropriate social situation in which to initiate and pursue discussions related to the finalization of plans for the final products that were to emerge from the PECOS project. Interestingly, as this initiative entered into the domain of the seminar, the situation of the seminar itself was transformed somewhat. Specifically, the physical and social positioning of the subjects who were participating in the process were altered such that seating was arranged in a circle and no one assumed an explicit position at the speaker's podium. Rather, the person leading the discussions occupied a physical position within the circle of participants who were attending and participated with the others to facilitate a discussion that was oriented to the realization of both general and particular interests. Overall, the observation of these practices in the seminars oriented to discussions about the final products of the project were interpreted as indicators that the general conditions of symmetry that had originally been observed within the interdisciplinary seminar series exhibited a capacity to become increasingly symmetrical.

Another interesting observation to emerge from the systematic investigation of the seminar situation within PECOS and its interrelation with other components of the project was the replication of aspects of the normative social structure of the seminar in other locations within the project. In particular, residuals of the dialogical relationships which constituted and regulated the social actions within the seminar situation had been

explicitly evident in the early meetings of the PECOS Management Committee Meetings when that situation had been observed to be behaving more as a public sphere, than as an effective and efficient system of management and administration.

The co-existence of these dual tendencies was in fact observed to be a relatively pervasive feature of the PECOS Project at the global level. What was observed to vary over time, as well as between and within particular contexts, was the emergence of one tendency to a occupy a position of dominance over the other. As discussed in this chapter, the rise to dominance of instrumental or purposive rationality was observed to be a feature in particular locations of the project. This tendency was observed to be most prevalent at the level of management and administration. It was also observed to be a tendency at the level of the research foci of the project although the tendency to adopt instrumental or purposive rationalities did vary somewhat between the different foci and within foci at different points in time. Within the seminar context, an opposite tendency was observed. In the seminar situation, the practice of communicative reason was observed to be a defining feature of the situation which was sustained over the duration of the project. Overall, there was no instance in which the tendency to resort to instrumental or purposive rationality was observed to have the capacity to preclude entirely the emergence and practice of communicative reason within particular social situations. In fact, in situations where disputations explicitly thematized the validity of a theoretical or practical normative claim, switching over to practices of communicative reason was frequently observed to be the option of first choice for participants within the project. In the event that a satisfactory resolution could not be achieved through the procedures of communicative reason, the alternative was to resort to a procedural

solution around which there was some level of pre-existing agreement among the parties to the dispute. It has been concluded from the observations and analysis that have been reported in Chapters Five and Six that the interaction of rational accountability and rational autonomy within contexts of interdisciplinary inquiry and conduct in the university is not exhausted by the practice of instrumental or purposive rational action. The implications of the analysis and findings of this research for realizing the progressive potentials of interactions between rational accountability and rational autonomy in academic practice are the focus of discussion in the concluding chapter.

CHAPTER SEVEN
PRACTICING RATIONAL ACCOUNTABILITY AND RATIONAL AUTONOMY THROUGH A COMMUNICATIVE ETHIC

The interaction of rational accountability and rational autonomy in academic practice has moved to the centre of the contemporary science policy discourse and university-society relations more generally. Given contemporary trends at the intellectual, political, and public levels of the discourse, it is reasonable to anticipate that debate over the rational accountability and rational autonomy of academic practice in society will escalate and intensify into the future rather than dissipate. The constellation of particular and general needs and interests that have coalesced in the debate are not easily distinguished—all at once, or once and for all. This dissertation has demonstrated that the presupposition of a fundamental opposition between rational accountability and rational autonomy in academic practice is a distorted one.

Conventionally, questions about the interaction of rational accountability and rational autonomy in academic practice have been posed and addressed as problems that involve the interaction of inter-dependent, yet diametrically opposed interests and needs. Realizing the needs and interests of government, business, and society have been portrayed as problems of increasing and extending the instrumental or purposive rational accountability and relevance of the university to the subsystems of the state and the economy. Alternatively, the realization of general interests and needs have been

portrayed as problems that warrant university autonomy and protection of the rights of public intellectuals to practice academic freedom and autonomy within a university system that is autonomous and relatively free from external influence. In the contemporary historical context, defending university autonomy and the freedom and autonomy rights of public intellectuals in terms of the traditional university's claim to embody an ideal life form of exemplary rational character is an option that is no longer available to the university. It has been argued in the dissertation that the grounds for invoking the normative claim of the traditional university have been eroded by meta-theoretical debates in the intellectual discourse and by the association of contemporary real world problems with past practice. In this context, the interaction of rational accountability and rational autonomy has become a critical issue for the university as it is increasingly identified as a central and useful institution for producing instrumental and purposive responses to contemporary problems. The dissertation argues that extending the functional capacity of the university and realizing the extra-functional responsibilities of the university are increasingly dependent upon challenging and transcending the grounds for the presupposition of a diametric opposition between interests in rational accountability and interests in rational autonomy. One contingency in the contemporary historical context that is creating an "ideal"opportunity to realize this objective is the turn to interdisciplinary inquiry and conduct within the university sector. It is important to acknowledge, however, that transforming the "ideal" opportunity of interdisciplinary inquiry and conduct into a "real" opportunity is merely, and always, a 'practical hypothesis'. As a practical hypothesis, interdisciplinary inquiry and conduct is neither an inevitable reality that the university must simply adapt to, nor

is it a utopia for realizing the progressive potential of the university in modern society.

The research question posed in the dissertation was "how do academics practice interdisciplinary inquiry and conduct and how do these concrete practices relate to the reproduction of the regulative ideal of the university as a community that practices public reason?" Instead of presupposing the communicative or social rationality of the intersubjective world of academic practice, or denying the possibility of its constitution and regulation, the dissertation makes the intersubjective world of academic practice problematic. To accomplish this objective the dissertation asks how and why academics constitute and regulate the facticity and normativity of their intersubjective world in the public spaces of the university as a means to gain access to the objective and subjective worlds of academic practice.

The literature review argued that contemporary accounts of the interaction of rational accountability and rational autonomy are unsatisfactory for responding to these questions because they have failed to problematize the processes and procedures of argumentation within the public spaces of the university. These analyses tend to remain at the level of meta-theoretical debate or conceive of micro-level interactions as inherently asymmetrical. Consequently, they have failed to make the processes and procedures of practical argumentation in academic practice explicit within a comprehensive framework that attends to the social rational basis for asserting an ethic of progressive academic practice in contemporary social contexts. These analyses have also failed to investigate the potential for transforming asymmetrical social relations of communication into communicative social relations that approximate the conditions of general social symmetry. These transformations are accomplished by constituting and

regulating social learning processes within public spaces of the lifeworld that are conducive to realizing rational dispositions to participate in the processes and procedures of practical argumentation.

The literature review led to the conclusion that these failures arise from a misunderstanding of the nature and source of the rationalities that constitute and regulate public academic practice within the public spaces of the university sector. Because of this misunderstanding, the major disputants in the contemporary debate over the interaction of rational accountability and rational autonomy have reached an impasse in their efforts to assert an ethic of progressive academic practice. It has been argued in the dissertation that the source of the misunderstanding is a common presupposition among the disputants that rational social action is to be reduced to instrumental or purposive rationality.

The literature reviewed in Chapter Two concentrated on a selection of classical and contemporary meta-theoretical discourses that are maintaining and contributing to the perception of a diametric opposition between the public's interest in rationalizing the accountability of the university and the university community's interest in maintaining the freedom and autonomy of academic practice within a university that is free and relatively autonomous. In the contemporary context, the major disputants at the meta-theoretical level of the debate are proponents of a re-invented historicism and proponents of a re-invented scientism. The literature review argued that these approaches provide unsatisfactory responses to the problem of the interaction of rational accountability and rational autonomy because they fail to problematize the processes and procedures that are constitutive and regulative in the everyday intersubjective world

of academic practice.

The postmodern standpoint was selected as exemplary of the new historicism that has emerged into the contemporary intellectual discourse. An overview of normative and analytical positions within the postmodern literatures was undertaken to demonstrate that the postmodern standpoint is a view from "nowhere" and "everywhere" simultaneously. As such, the postmodern standpoint embodies an intrinsic appeal to someone, somewhere, all of the time. To gain depth into the insights of a postmodern perspective, Foucault's genealogical project was selected as exemplary and worthy of a more detailed examination in light of his investigations into the interaction of knowledge and power in modern society. Although the perspective was found wanting in its capacity to provide a meta-theoretical framework for a reflective theory of knowledge and a corresponding ethic of progressive academic practice, it was concluded that Foucault's genealogical project embodies considerable methodological value. Consequently, it is a perspective that cannot be easily dismissed. The dissertation has drawn on the methodological value of Foucault's insights by adopting a Foucauldian form of genealogical approach to delineate a selective history of science-university-government-political interactions in the Canadian context.

An examination of classical conceptions of the problem of reason and rationality in the philosophical discourse of modernity was undertaken to gain insight into the philosophical formulations of this problem and to explore the relevance of these formulations for investigating the problem of societal rationalization in modern society. Kant's ahistorical and subject-centred conception of rational human consciousness was contrasted to Hegel's dialectical philosophy of historical reason. The influence of the

neo-Kantian and neo-Hegelian traditions of analytical rationalism in the development of critical social theory was elucidated through an examination of the classical critical social-theoretical insights of Marx and Weber.

Marx's neo-Hegelian critical social-theoretical conception of societal rationalization as a positive force in modern society that was impeded by the rise to dominance of capitalist relations of production was contrasted to Weber's neo-Kantian and pessimistic vision of societal rationalization as the creation of an 'iron cage' of instrumental and purposive rationality that is devoid of meaning, freedom, and autonomy. The critical social theories of Marx and Weber were found to converge, however, in their conception of the rationalization of modern society in terms of the rise to dominance and extension of instrumental and purposive rationality in modern society. In the Frankfurt School of contemporary critical social theory, Marcuse criticized Weber's conception of a rationalized modern world of "sensualists without heart and spirits without soul" and replaced it with a totalizing critique of the instrumental techniques of science and technology as a historical project of political domination. In making this shift, Marcuse extended the productivist bias in critical social theory that had originated with Marx. Marcuse grounded his solution to the technocratic domination of modern society in a philosophy of the subject that advanced an idealized conception of the human subject's capacity to re-establish a relation with nature as 'other' and not as an object of control. Advancing this solution, Marcuse established a basis for the return of critical social theory to its roots in speculative philosophy and severed its ties to the goal of realizing a practical intent that had been its defining characteristic.

While the new historicism has moved in the direction of a totalizing rejection of objective and universal reason in light of the negative effects of the dominance of instrumental and purposive rationality, the new scientism has moved in the opposite direction and has embraced the objectivating potential of a totalizing instrumental, purposive reason. At the same time, advocates for a revitalized scientism reduce the moral-practical and aesthetic value spheres of reason to the subjectivity of the individual and seal their encapsulation in the private sphere. The roots of the new scientism were traced back to Comte's positivist conception of a social science set free from the domain of speculative philosophy and the positivistic interpretation of Marx's optimism concerning the emancipatory potential of modern science and technology for society. The rise to dominance of a positivist agenda for the sociologies of knowledge and science in the frameworks of both traditional and critical social theory was acknowledged and attention was turned to an examination of the methodological disunity of the natural and social sciences within the value sphere of positivist science.

The methodological disunity debate was prioritized over a more detailed examination of positivist sociology of science literatures because it was in the context of this debate that the conception of the 'one' world of objective scientific facts was challenged from within the value sphere of objective science. The examination of Weber's contributions to the methodological debate found this challenge to be limited in its capacity to provide a framework for a reflective theory of knowledge and a corresponding ethic for progressive academic practice. The limitations of the challenge were attributed to Weber's failure to extend his investigation of *veresthen* into an examination of precisely how the objective world of "facts" and the subjective world of

"understanding" are made available within the context of an intersubjective world that is constituted and oriented to realizing of mutual understanding.

The post-positivist turn in the philosophy, history, and sociology of science has been conventionally attributed to Kuhn's (1970 [1962]) historicist challenge to the dominance of rational empiricism in the value sphere of science. It has been suggested here that this is an attribution which ignores the extended history of debate and argumentation that have influenced contemporary conceptions, uses, and problems of reason and rationality. As an alternative to the post-positivist conceptions of science that have been inspired by the Kuhnian legacy, the dissertation has argued for the adoption of a model of post-positivist science that is grounded in a reconstituted concept of the value spheres of reason through the practice of a communicative ethic in public spaces of central social institutions. Habermas's theory of communicative action and his commitment to the practice of a communicative ethic in theory and practice were identified and elucidated as a meta-theoretical framework and orientation for realizing this goal.

The dissertation takes up Habermas' theory of communicative action as a meta-theoretical framework within which an investigation into the opportunity for reinvigorating the capacity of human reason as the practice of public reason in public spaces may be grounded and extended. The point of departure for Habermas' theory of communicative action is the presupposition that communication oriented to mutual understanding is the teleological condition of human existence. Specifically, Habermas argues that communication is the fundamental condition for both human production and human reproduction. Given this presupposition, Habermas provides a reconstructed and

comprehensive theory of rationality that identifies communicative reason or communicative rationality as a fundamental condition for human rationality; a condition that includes the individual's capacity to acquire and use cognitive instrumental rationality. It is the fundamental condition and necessity of communicative reason for human existence that Habermas considers to have been misunderstood and distorted in the philosophical discourses of modernity.

Locating his critical social theory within the meta-conceptual framework of communicative reason, Habermas argues that the uncritical adoption of a distorted understanding of human reason as cognitive instrumental reason has given rise to a distorted and one-dimensional conception of processes of rationalization in the development of modern society. Rationalization in modern society has been understood in terms of the rise to dominance and extension of functionalist and instrumentalist forms of rationality into the domains of both the system and the lifeworld. While Habermas views the development and extension of instrumental and functional rationalities as essential and necessary for the development of societal subsystems in society, the encroachment and extension of these forms of rationality into the lifeworld is identified as problematic for both the system and the lifeworld. This problematic arises from Habermas' conception of the lifeworld as the source of both moral-practical rationality and instrumental purposive rationality that are produced and reproduced through ongoing processes of communicative rationality. For Habermas, it is the revitalization of the lifeworld and the reconstruction and extension of the rationalization of society as a dual process—of cognitive instrumental rationality and moral-practical rationality—that is necessary if we are to realize an undistorted understanding of

contemporary social conditions. Within the framework of his theory of communicative action, Habermas rejects the position of those who portray the Enlightenment Project of universal reason and objective knowledge as fundamentally false and dominating, in favour of a view of the Enlightement Project as an unfinished project that is in a constant process of realization. The means for continuing and extending this project are, according to Habermas, ongoing efforts to constitute and maintain conditions that are conducive to open and public debate on issues of common interest in revitalized public spaces of the lifeworld. In sum, Habermas is calling for a reconstitution and extension of the conditions necessary for the practice of practical argumentation in society in general and within central social institutions in particular, as a means to diagnose contemporary conditions and to realize the positive potentials of modernity.

Interest in fostering and facilitating a new paradigm for science that is interdisciplinary, inter-sectoral, and integrative is a conceptual and empirical category in the contemporary discourse where normative claims concerning the interaction of rational accountability and rational autonomy are being contested. As suggested above, the university is being identified in this discourse as a central and increasingly useful institution for the realization of needs and interests that are varied, and at times, contradictory. As the university is seen to be increasingly central and useful in society, the institution and its members are being drawn further into an arena of economic conditions, interests, and relations that have been a part of the historical experience of universities since their integration into society as public institutions. At the same time, universities and their constitutents are being drawn into an arena of intellectual, political, ethical, and moral struggles that have not been a prevalent and pervasive

experience in academic practice since the constitution and regulation of the university as a public social institution.

One of the prevalent themes in the new interdisciplinary science discourse is the need to enhance the accountability and relevance of the university as a means to realize public needs and interests. The government is advocating for, and establishing mechanisms to foster the integration of the university sector into interdisciplinary and integrated models of knowledge production as a means to enhance the accountability and relevance of the university to the public. The need to realize these interests is embedded in a compelling rhetoric of the emergence of a new knowledge based society and economy, processes of globalization and globalizing competition, the need to foster high quality and sustainable standards of living, and the need to create and maintain open and transparent forms of governance in public institutions. In practical terms the increased accountability and relevance of the university is being constructed to mean that the university is to become more effective, efficient, strategic, and functional in its use of public resources and in its efforts to serve society by becoming more accountable and relevant to government. The explicit and implicit normative claim that is advanced in these arguments is that being accountable to the government and to the economy is being accountable to the public.

Critics of the new paradigm of interdisciplinary and integrated science counter these arguments with the claim that the accountability and relevance discourses are a strategy for eroding the autonomy of the university and the freedom and autonomy of academic practice. The proponents of the counter claims are invoking the traditional university's conception of academic freedom and autonomy as residing in the freedom

and autonomy of the individual to pursue knowledge in isolation from the imperatives of society as a means to defend the university from external demands. At this level of the discourse, an impasse similar to that found in the intellectual discourse appears to have been reached. The reality of the contemporary historical situation, however, is that many of the uncertainties and conditions that are being advanced to justify current trends are in fact real conditions and real problems. Given this situation, the university cannot risk ignoring its responsibility to contribute to a general interest in resolving these problems. Should the university refuse to participate in the search for solutions to contemporary problems its actions would undermine the university's fundamental normative claim to be committed to the pursuit of objective knowledge and universal reason as a means to serve the common interests of humanity.

This dissertation has taken the interaction of rational accountability and rational autonomy in the practice of interdisciplinary inquiry and conduct within the university as an empirical focus. The extended case study method was adopted as a strategy for linking Habermas' conceptual framework to the empirical data that was generated from the field research component of the study. It provided a means to operationalize the theory of communicative action as an interpretive framework and to realize its capacity as a meta-conceptual framework. Specifically, the extended case study method was used as a strategy to gain access to the various levels of argumentation that were circulating within the public spaces of the PECOS case of interdisciplinary science as a means to capture both an internal and external understanding of the dynamics of that argumentation. As discussed in Chapter Three, one of the primary advantages of the extended case study method as a qualitative research methodology is its orientation to

understanding the micro-level of social interaction within the context of its historical determination. The findings from the examination of the interaction of the macro and micro level contexts of the PECOS case are discussed in the next section.

7.1. Discussion of Findings

To respond to the research question of how academics practice interdisciplinary science and the implications of that practice for the reproduction of the university as a community that practices public reason, the interdisciplinary science discourse in Canada needed to be located within its historical context. This historical context was established by constructing a form of Foucauldian genealogy that attended to the history of the interdisciplinary science discourse in the present. In constructing this genealogy, an explicit emphasis was placed on mapping emergent and inter-related trends in the various policy discourses which are converging in the category of a revitalized interest in interdisciplinary science. Specifically, an emphasis was placed on the policy discourses emerging from historical efforts to develop a central science and technology policy in Canada, discourses that have, and are shaping university-government relations, and policy discourses relating to the need to practice informed decision making in environmental policy decision making within a paradigm of sustainable development.

The reconstruction of the historical context of interdisciplinary science in the Canadian context provided support for the claim that the political subsystem in society is exhibiting an interest in reconstructing the extra-functional responsibilities of the university in a functional light. This interest was found to be emerging alongside the relatively long standing historical tendency for the political subsystem to view the

university as a functionally useful institution primarily in terms of its anticipated, and real contributions to the economic reproduction of society through the production of technically exploitable knowledge and skilled workers. In the new science-policy-politics discourse, interest in the extra-functional capacities of the university are being advanced and justified in the form of a generalized interest to serve the public interest. Paradoxically, the argument for pursuing this interest is being couched in a compelling rhetoric that appropriates the constitutive and regulatory capacity of ideal communicative rationality as a means to pursue the functional interests of systems rationality. A further irony of the contemporary situation is that it is within the context of a factual realization of the conditions of the ideal of communicative rationality that a potential for re-appropriating and extending the emancipatory potentials of communicative reason is lodged. In this situation of paradox on paradox, the university has emerged as a 'truly' useful institution that has the capacity to participate in the project of serving the 'genuine' public interest to realize its capacity to practice public reason. The Tri-Council Eco-Research Program and the PECOS Project were identified as developments well suited to investigating the central problem that guided this research in light of their claim to be interested in realizing the practical potential of university research as public reason.

The analysis of data generated from the field study component of the study was carried out at two levels. Firstly, an extension into the micro-level social interactions of the PECOS Management Committee was undertaken to capture an understanding of the process and procedure of interdisciplinary inquiry and conduct from the perspective of the participants who were actually engaged in the practice of planning and doing

interdisciplinary research within the university. The analytical goal was to move from a general understanding of what the researchers wanted to do, to a more particular understanding of how they actually did it. In moving from the know what, to the know how level of the intersubjective world of PECOS, it was found that much of their know how was revealed in their commitment to expressing a rational disposition to account for their actions to others with reasons, and to hold others accountable for their actions by requesting, listening to, and evaluating their reasons. As demonstrated in the analysis of outcomes in Chapter Five, the rational accountability of the research faculty was observed to emerge from their willingness to engage in processes of collective interpretation as a means to clarify their situation. In this process they demonstrated a capacity to learn from the process of clarifying mistakes as a means to determine how to proceed with the particular problems that confronted them. In the actual example that was reproduced and examined in Chapter Five, the outcome of the collective interpretation of the problem situation was observed to be the realization and revitalization of a level of mutual understanding that the participants could agree to live with. It was acknowledged, however, that achieving an actual understanding on contested validity claims was not always a possibility in situations that arose in the development of the PECOS Project. In those cases, the participants were observed to resort to an alternative, or pre-existing mutual understanding on procedural means to settle the problematic issue. From the observations and analysis carried out at the micro level of social interaction within the PECOS case it was concluded that the project was developing with an orientation to both instrumental or purposive rationality and communicative rationality.

An examination of the interactions between instrumental or purposive rationality and communicative rationality in the PECOS Project overall, and in various sub-components of the project required a movement to the macro-level of the project. It also required the adoption of an external perspective in order to undertake a mapping of the types of rationalities that were observed to emerge to dominance in particular spaces. From the analysis, it was concluded that the management and administration of the project was moving in the direction of accounting for, and to itself in terms of the standards of instrumental and purposive rationalities. At the level of the research foci, it was found that there was variability among the groups in terms of the tendency to constitute and regulate themselves in relation to standards of either instrumental or purposive rationality and communicative rationality. The practice of communicative rationality was found to be most visible in the context of the focus two group. This finding has been attributed to the focus two inclusion of a diversity of normative perspectives concerning the orders of rational science and the orders of rational organization. The outcome has also been attributed to the intensity and frequency of face to face interaction that was observed to occur within the focus two location of the project. Overall, however, as the research proceeded there were indicators that all of the groups were moving toward the adoption of instrumental or purposive rational action as a means to get the task done.

At the other extreme of the rationality continuum, the PECOS Seminar Series was identified as a particular public space in the project where the dominance of the practice of communicative action was apparent from the outset and was observed to be sustained throughout the project. Moreover, residuals emerging out of the PECOS

Seminar space were observed to emerge in other locations of the project and to function as resources in those locations when processes of reflection, deliberation and argumentation emerged. From these observations, it ~~was~~ concluded that there is evidence to warrant the claim that the university seminar is a particular location where the facticity and normativity of rational university learning processes converge on a regular, albeit temporary basis in the ongoing affairs of the university community. Generalizing from this observation, it has been concluded that the interaction of rational accountability and rational autonomy in academic practice is not simply an interaction of diametrically opposed interest positions on a single continuum. In public spaces and situations that are constituted and regulated in forms that reflect the normative structure and process of the regulative ideal of the university seminar, the potential for realizing balanced interactions between rational accountability and rational autonomy in academic practice is enhanced. Given the trends and problems that are emerging in the contemporary context, taking steps to realize the ideal social conditions of the university seminar in public spaces both inside and outside of the university are no longer simply an option. Rather, this is an interest that has moved to the level of a communicative imperative if the university is to reproduce both its functional and extra-functional responsibilities by reproducing itself as a community that practices public reason. Moreover, this is an interest that is not exclusive to the academy. Rather, it is an interest that is generalizable to the public, if the public seeks the reproduction of the university as a central public institution that has the capacity to contribute to realizing the dual interests of reason and democracy in the contemporary context.

7.2. Theoretical and Practical Implications of Practicing Habermas' Communicative Ethic

The processes of data collection, analysis, and conceptual evaluation that were adopted in this study and dissertation were iterative and reflective. Combining conceptual analysis with empirical research in a dialogical relation is the fundamental methodological logic of the extended case study method. Establishing dialogical relations with classical and contemporary social theoretical perspectives as a means to build upon their strengths and learn from their mistakes is the fundamental principle that informs Habermas' theory of communicative action. It is also the fundamental principle that informs Habermas' advocacy for the adoption of a communicative ethic in the central social institutions of a society that subscribes to a general interest in realizing the positive potentials of a life that is informed by and grounded in reason and rationality. The methodological logic of establishing dialogical relations and the principle of practicing a communicative ethic with the social science community and with academics participating in the constitution and regulation of interdisciplinary inquiry and conduct within the university sector have been adopted in this dissertation. The social- theoretical, methodological, and practical implications of subscribing to these fundamental principles in the dissertation may now be assessed.

In assessing the social-theoretical implications of the dissertation, one of the main criteria was whether Habermas' meta-conceptual framework of a theory of communicative action had the capacity to make visible and account for the norms of rationality that are operative in the everyday world of academic practice. The primary criteria for assessing the methodological implications of the research was to establish

In assessing the social-theoretical implications of the dissertation, one of the main criteria was whether Habermas' meta-conceptual framework of a theory of communicative action had the capacity to make visible and account for the norms of rationality that are operative in the everyday world of academic practice. The primary criteria for assessing the methodological implications of the research was to establish whether the framework of a theory of communicative action had the capacity to allow for the constitution of dialogical relations with the social actions of academics involved in the practice of interdisciplinary inquiry and conduct as a means to interpret and reflect on the normative and theoretical assumptions that were informing that practice. The primary criteria for assessing the practical implications of the dissertation was to establish whether the theory of communicative action has the capacity to enable a diagnosis of distortions of the ideal of practicing a communicative ethic that are emerging in the constitution and regulation of interdisciplinary inquiry and conduct within the university sector.

It has been demonstrated in the dissertation that Habermas' theory of communicative action is a useful framework for making the norms of rational social action that operate in the micro-level and macro-level interactions of academic practice visible. The application of the framework of a theory of communicative action to the micro-level interactions of members of the PECOS project in their everyday deliberations was found to be useful for sensitizing the analysis carried out in this study to the multiple validity claims that were thematized and contested in the public spaces of the PECOS project. The analysis demonstrated that members of the PECOS Management Committee, and PECOS participants more generally, exhibited a rational

disposition to differentiate between their scientific interest in defending truth validity of claims within the specialized public spaces of theoretical discourse in their disciplines and their general interest in assessing the defeasibility of the normative validity of those discourses within the historical and practical contexts of their situation. From this demonstration it has been concluded that the rational culture of academic practice is not exhausted by the practice of instrumental or purposive rational action within the value sphere of science. Rather, participants in the PECOS project were observed to draw on their capacity to practice the norms of communicative rationality to assess the defeasibility of scientific and moral-practical normative validity claims in particular contexts as a means to coordinate their social actions within the project and the university. Practicing the norms of communicative rationality also operated as a basis for realizing their capacity to practice the instrumental or purposive rational action of science and scholarship. In addition to learning and practicing the normative validity claims of scientific rationality, academics draw on their capacity to communicatively learn to assess the efficacy of normative validity claims in the theoretical and moral-practical discourses that are relevant to concrete contexts. One implication of this conclusion for the ongoing evolution of social theoretical discourse in the academic community is to highlight the importance of identifying and comparatively evaluating the instrumental and moral-practical meta-conceptual validity claims that are being advanced in these discourses.

Applying the theory of communicative action to classical and contemporary diagnoses of the normative and theoretical assumptions that are informing social theoretical and methodological investigations in the domain of social scientific

academic practice demonstrated the critical value of engaging in a dialogical exchange with the established consensus of the social science community. Using the theory of communicative action to constitute dialogical exchanges among competing perspectives at the theoretical and methodological levels of the social science community demonstrated the efficacy of building on the insights of those critical interactions. It also attests to the importance of learning from the mistakes and misunderstandings that have emerged from distorted communications among members of the social science community. One of the explicit implications of this process was to demonstrate the importance of identifying and adopting methodological strategies that enable linkages to be drawn between the micro-level of social interaction and the macro-level of theoretical generalization. In this research, the utility of Burawoy's extended case study method for operationalizing categorical elements of Habermas' theory of communicative action has been demonstrated as a means to pursue and extend the project of applied critical social theory in contemporary society.

Finally, analysing exemplary practices of communicative rationality in the case that provided an empirical focus for this study and participating in a process of communicative action with the established consensus of the academic community created an opportunity for investigating and generating hypotheses about the particular rationalities that are shaping, and that are shaped by, interactions within particular contexts of academic practice. The analysis of practices of communicative rationality that emerged in the PECOS project and the processes of communicative rationality that were undertaken in the research have implications for realizing the rational disposition of academics to practice a progressive ethic of rational accountability and rational

autonomy as an explicit goal in contemporary society. The dissertation has demonstrated that by making the norms of communicative rational action that constitute the lifeworld of the university as a public sphere in society explicit, the university community retains a capacity to demonstrate its rational autonomy and rational accountability as a central institution for the practice of public reason in society. The practical realization of this capacity is not a possibility within the context of an institution that is resistant to change and defensive of its traditional image as the guardian and protector of reason in society. Rather, the realization of this capacity is embodied in the motivation and commitment of constitutents of the lifeworld of the university to participate in public debates over the defeasibility of normative claims that reduce the university to its functional accountability and relevance to the political and economic subsystems of society. By participating in processes of public debate over the particular demands that are confronting the contemporary university, an opportunity is created for demonstrating the efficacy of practicing public reason in the central institutions of a society that is not fixed historically and that is committed to achieving new levels of understanding in historical contexts that are characterized by conditions of uncertainty, complexity, and contestation. As suggested in the introduction and defended in the arguments and empirical analyses that have been presented in the dissertation, the constitution and regulation of the university as a community that practices public reason is an ongoing historical project. It is an historical project that is not realized all at once, or once and for all. Rather, the thesis that has been argued and defended in this dissertation is that the public rational character of the university as a community that practices public reason is a "practical hypothesis". This practical

hypothesis is embodied in, and potentially realized through participating in communicative actions in historical contexts where we publicly subscribe to an ethos of using our practical argumentative know how as a means to know that.

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APPENDIX I

SUMMARY OF PECOS DATA SET

DATE (D/M/Y)	SITE	THEMES	DOCUMENTS	AUDIO-TAPES	COMMENTS
26/04/94	PECOS Mgt	Project planning	Project proposal, assessor reports, minutes for 15/04/94 meeting		Observation and field notes only
04/05/94	Information System Subcommittee	Information management planning	Agenda, minutes		Not attended
04/05/94	PECOS Mgt	Proposal revision, budget reduction	Foci budget proposals, revised research proposal draft	3 hours	Transcribed (T)
11/05/94	PECOS Mgt	Proposal revision, budget reduction	Agenda, correspondence	3 hours	T
24/06/94	Focus One	Update researchers on status of project	Notice of meeting, agenda, minutes	3 hours	T
19/07/94	Focus One	Data collection strategy	Notice of meeting, agenda, minutes, participant list	3 hours	T

19/07/94	Focus Three			2 hours	T
20/07/94	PECOS Mgt	Press conference debriefing, member reports, NCE proposal, operations strategy, graduate students, sub-committee structure	Minutes	5 hours	T
09/09/94	PECOS Mgt	Study area tour			Observation only
26/09/94	Focus One	Course proposal, research abstracts, questionnaire development	Notice of meeting, agenda, abstracts, minutes, project and research foci objectives	3 hours	T

04/10/94	PECOS Mgt	Conceptual integration, focus group reports, financial administration, information systems, study participants, committee structure, seminar, course, membership, workshop	Notice of meeting, minutes	4 hours	T
05/10/94	Focus Two	Management and subcommittee reports, survey questionnaire, linkages, organization strategy	Notice of meeting, agenda, minutes, focus two work plan		Observation only
12/10/94	PECOS Seminar			1 hour	T

14/10/94	Focus One	Research abstracts, Management, sub-committee reports, questionnaire development, meeting schedule	Notice of meeting, minutes, participant list, abstracts, linkages to other foci	4 hours	T
26/10/94	PECOS Seminar			1 hour	T
01/11/94	PECOS Mgt	Seminar, administrative assistance, public participation, workshop, membership	Notice of meeting, minutes	3 hours	T
02/11/94	Focus One	Questionnaire development, sampling design	Notice of meeting, agenda, minutes, questionnaire draft	2 hours	T
04/11/94	Focus Two	Committee reports, survey questionnaire	Notice of meeting, agenda, minutes, participant list	3 hours	T
08/11/94	Graduate Student meeting			1 hour	T
16/11/94	PECOS Seminar			1 hour	T

22/11/94	Graduate Student Meeting			1 hour	T
23/11/94	Focus One	Meeting procedures, student recruitment, budget allocations, questionnaire and data collection	Agenda, minutes	2 hours	T
25/11/94	PECOS Mgt	Stakeholder's workshop, seminar program, focus group coordination, budget, course outline and proposal	Notice of meeting, agenda, correspondence, minutes, course outline draft, participant list	5 hours	T
30/11/94	PECOS Seminar			1 hour	T
09/12/94	Community Stakeholder Workshop			9 hours	

12/12/94	PECOS Mgt	Physical space, student participation, budget, study centre location, sub-committee structure	Notice of meeting, minutes, correspondence, budget proposals	4 hours	T
16/12/94	Focus Two	Stakeholder workshop debriefing, interviews for PDF's	Notice of meeting, agenda	1 hour	T
19/12/94	PECOS Mgt	Budget, management procedure, sub-committee functions, inter-university relations, accounting	Notice of meeting, budget proposal, agenda, minutes	4 hours	T
21/12/94	Focus One	Questionnaire development	Notice of meeting, Questionnaire draft, Minutes		Not attended
03/01/95	Graduate Student Meeting			2 hours	

05/01/95	Questionnaire Subcommittee meeting	Sampling design and selection options	Notice of meeting, agenda, minutes		Not attended
06/01/95	Focus Two	Survey questionnaire, Committee reports	Notice of meeting, agenda, minutes, correspondence		T(partial)
10/01/95	Focus Three			3 hours	T
11/01/95	Focus One	Update on questionnaire development in other foci	Notice of meeting, agenda, minutes	3 hours	T(partial)
15/01/95	Questionnaire subcommittee	Update on communication among foci, data collection strategy	Minutes		Not attended
18/01/95	PECOS Seminar			1 hour	
20/01/95	Focus One	Questionnaire, development administration, sampling strategy,	minutes	2 hours	T
25/01/95	PECOS Seminar			1 hour	

03/02/95	Focus Two	Survey questionnaire, recruitment of community participant, committee reports	Notice of meeting, agenda, Focus Two objectives (original and revised), questionnaire draft, minutes	3 hours	T
06/02/95	Information Systems Sub-committee	IS Handbook, technical staff, linkage to data collection and sampling design sub-committee, information and communication strategy	Agenda, minutes, digital files listing		Not attended
06/02/95	PECOS Mgt	Study centre, organizational structure, accounting, community representatives, sub-committee reports, course, annual report	Notice of meeting, announcements, correspondence, minutes, committee reports, revised budget, management proposal, participant list, sub-committee membership	4 hours	T

08/02/95	PECOS Seminar			1 hour	
10/02/95	Questionnaire subcommittee	Data collection strategies	Notice of meeting, minutes		Not attended
15/02/95	PECOS Seminar			1 hour	
28/02/95	Questionnaire subcommittee	Focus Two data collection strategy	Notice of meeting, minutes		Not attended
01/03/95	PECOS Seminar			1 hour	
06/03/95	PECOS Mgt	Supervisory committee guidelines, study centre, newsletter, budget allocations, focus group and committee reports, inter-university relations, annual reporting	Notice of meeting, agenda	3 hours	T
08/03/95	PECOS Seminar			1 hour	

10/03/95	Focus Two	Recruitment of community participant, survey questionnaire, committee reports	Notice of meeting, agenda, correspondence, questionnaire draft, study area information, minutes	2 hours	T
15/03/95	Focus Three			1 hour	T
15/03/95	PECOS Seminar			1 hour	
21/03/95	Questionnaire Subcommittee	Data collection strategies	Minutes, correspondence		Not attended
22/03/95	PECOS Seminar			1 hour	
29/03/95	PECOS Seminar			1 hour	
03/04/95	PECOS Mgt	Community meeting, supervisory committees, study centre, annual Eco-research meeting, terms of reference for sub-committees	Notice of meeting, agenda, correspondence, minutes, annual report draft, committee reports	2 hours	T

04/04/95	Focus One	Data collection update, community meeting, annual report	Notice of meeting, agenda, minutes, questionnaire draft	1 hour	T
10/04/95	PECOS Seminar			1 hour	
13/04/95	Focus Two	Survey questionnaire, recruitment of community participant, committee reports, volunteer canvass	Notice of meeting, agenda, minutes	4 hours	T
24/04/95	Questionnaire Subcommittee	Graduate student needs re: data collection, questionnaire development	minutes, telephone survey questionnaire draft	2 hours	T
26/04/95	Focus Three			3 hours	T
01/05/95	Focus One	Questionnaire development	Notice of meeting, agenda, minutes	1 hour	T

01/05/95	PECOS Mgt	Public involvement, supervisory committees, study centre, summer students, sub-committee terms of reference, seminar, focus group and sub-committee reports, community representatives	Notice of meeting, agenda, supervisory committee guidelines, minutes, correspondence, conference registration information	3 hours	T
05/05/95	Graduate Student Meeting			1 hour	
10/05/95	Graduate Student/ Supervisor Workshop			3 hours	
11/05/95	Focus Two	Survey questionnaire, recruitment, volunteer canvass, committee reports	Notice of meeting, agenda, minutes	3 hours	T

16/05/95	Questionnaire Subcommittee	Sampling needs of graduate students, data collection budget, questionnaire development, ethics approval	Minutes	2 hours	T
09/06/95	Focus Two	Survey questionnaire, committee reports	Notice of meeting, agenda, minutes, study area stats, questionnaire draft	3 hours	T
19/06/95	Questionnaire Subcommittee	Review data collection RFP's	Notice of meeting,	2 hours	
06/07/95	Focus Two	Survey pre-test, committee reports, linkage to focus one, community involvement	Notice of meeting, agenda, participant list, supervisory committees, minutes, Questionnaire draft, pre-test results, correspondence	2 hours	T

10/07/95	PECOS Mgt	Guidelines for supervisory committees, study seminar, foci and committee reports, administrative issues	Notice of meeting, agenda, minutes, committee reports	3 hours	T
18/07/95	PECOS Field Seminar		Agenda		Observation only
25/07/95	Questionnaire Subcommittee	Meeting with representatives from firms responding to RFP	minutes	2 hours	
06/09/95	Focus One	Telephone survey update	Notice of meeting, agenda, minutes	1 hour	T
07/09/95	Focus Two	Field trip report, telephone survey update, questionnaire pre-test, community liaison, committee reports	Notice of meeting, agenda, minutes	3 hours	T(partial)

11/09/95	PECOS Mgt	Scheduling meetings, field seminar report, study centre report, telephone questionnaire, foci and sub-committee reports, course, budget	Notice of meeting, agenda, minutes, committee reports	5 hours	T
11/09/95	Graduate Student Meeting			1 hour	
20/09/95	PECOS Seminar			1 hour	
21/09/95	Questionnaire Subcommittee			2 hours	T
27/09/95	PECOS Seminar			1 hour	
02/10/95	Questionnaire Subcommittee	Access protocols for telephone survey data sets; analysis and interpretation issues	Minutes	1 hour	T

04/10/95	PECOS Mgt	Study centre, questionnaire final report, communications, budget, logo, committee reports, integration strategies	Notice of meeting, agenda, guidelines for access to data, discussion paper guidelines, minutes, correspondence	3 hours	T
04/10/95	PECOS Seminar			1 hour	
05/10/95	Focus Two	Community liaison, committee reports, community canvass, personal interviews	Notice of meeting, agenda, minutes	4 hours	T(partial)
11/10/95	Focus Three			2 hours	T
11/10/95	PECOS Seminar			1 hour	
18/10/95	PECOS Seminar			1 hour	
25/10/95	PECOS Seminar			1 hour	
01/11/95	Focus Two	Community canvass, ethics approval, community liaison, committee reports, phase 2 interviews	Notice of meeting, agenda	3 hours	T

01/11/95	PECOS Seminar			1 hour	
15/11/95	PECOS Mgt	Study centre, budget, access to data guidelines, committee reports, course, workshop	Notice of meeting, agenda, correspondence, committee reports, minutes	3 hours	T
15/11/95	PECOS Seminar			1 hour	
23/11/95	Focus Two	Community canvass, Graduate student concerns, Phase 2	Notice of meeting, agenda, minutes, committee reports, budget proposals	4 hours	T(partial)
22/11/95	Graduate Student Meeting			1 hour	
22/11/95	PECOS Seminar			1 hour	
29/11/95	PECOS Seminar			1 hour	
12/12/95	Focus Two	Community canvass analysis, committee reports	Notice of meeting, minutes	3 hours	T(partial)
04/01/96	Focus Two	Protocol and study design for Phase 2	Notice of meeting, agenda, minutes	3 hours	T(partial)
19/01/96	Graduate Student Meeting			1 hour	

24/01/96	Focus One	Telephone survey update, analysis strategies, presentation of results	Notice of meeting, agenda, minutes	1 hour	T
24/01/96	Focus Three			3 hours	T
31/01/96	PECOS Conference	Redefining Rural Community Structure	Agenda		Conference was video-taped by PECOS
07/02/96	PECOS Mgt	Study centre, budget, video production, sub-committee reports, Eco-research workshop, summer students, annual report, management retreat	Notice of meeting, agenda, sub-committee membership, minutes, correspondence	3 hours	T
09/02/96	Focus One	Annual report, presentation of results at WASA	Notice of meeting, agenda, progress report guidelines, minutes, abstracts for WASA	2 hours	T
14/02/96	PECOS Seminar			1 hour	

16/02/96	Focus Two	Phase 2 data collection, community liaison, committee reports	Notice of meeting, agenda, minutes	2 hours	T
28/02/96	PECOS Seminar			1 hour	
01/03/96	Focus One Training Seminar		Notice of training seminar	5 hours	Observations only
06/03/96	PECOS Seminar			1 hour	
20/03/96	PECOS Seminar			1 hour	
27/03/96	PECOS Seminar			1 hour	
27/03/96	Graduate Student Meeting			1 hour	
04/04/96	Focus Two	Phase 2 data collection, committee reports	Notice of meeting, agenda, minutes	3 hours	T(partial)
12/04/96	Focus Three/Community	Endangered Species Workshop		4 hours	

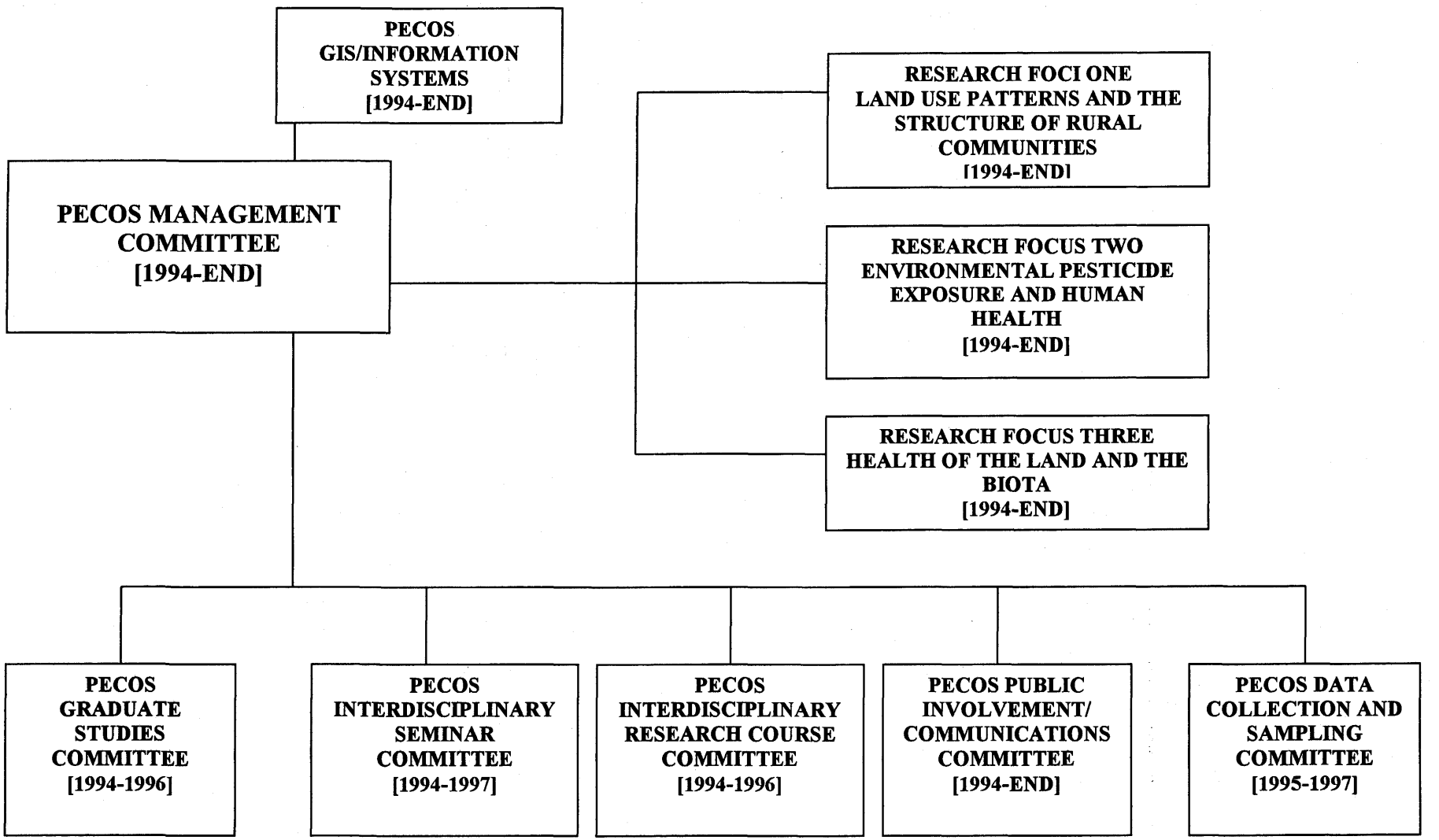
15/04/96	PECOS Mgt	Video production, summer students, annual report, Eco-Research Workshop, Management Retreat, Sub-committee reports, PDF position for integration, field seminars	Notice of meeting, agenda, committee reports, minutes, announcements and correspondence	4 hours	T
18/04/96	Focus Two	Phase 2, Foci membership, committee reports, qualitative research	Notice of meeting, agenda, minutes	3 hours	T(partial)
26/04/96	Focus One			3 hours	
06/05/96	Focus Two	Phase 2 baseline report, focus group membership and status, committee reports, qualitative study	Notice of meeting, agenda, minutes	2 hours	T

14/05/96	Focus Two	Qualitative study, Phase 2 assessment, committee reports,	Notice of meeting, agenda, participant list, research subject correspondence, minutes	2 hours	T
23/05/96	PECOS Mgt Retreat	Assessment of progress to date, planning for end product	Notice of retreat, agenda, summary report	5 hours	T
29/05/96	Focus Two	Focus Two accomplishments, challenges, end-products, committee reports	Notice of meeting, agenda, correspondence	3 hours	
18/06/96	Focus One	Annual report, foci membership, integration strategies	Notice of meeting, agenda, minutes, Annual report draft	2 hours	
10/06/96	Focus Two	Graduate student thesis work , baseline report, final stage of data collection	Notice of meeting, agenda, minutes	2 hours	Final meeting attended

17/06/96	PECOS Mgt	Annual reporting, Eco-Research Workshop, Management retreat, field seminars, committee reports, public meeting planning, thematic issue planning	Notice of meeting, agenda, policy proposal, correspondence, Eco-Research evaluation, Annual Report draft, minutes	2 hours	T
11/09/96	PECOS Seminar			1 hour	
23/09/96	PECOS Mgt	Thematic Issues, field seminars, think tank, sub-committee reports, graduate student reports, ECO summit report	Notice of meeting, agenda, minutes, sub-committee participant list, PECOS participant list, correspondence,		
09/10/96	Focus One	Selection of thematic issue subcommittee representative, researcher activities, student stipends	Notice of meeting, agenda, minutes		Observation only

09/10/96	PECOS Seminar	Thematic Issues		2 hours	
16/10/96	Focus One	Health Conference presentation	Meeting notice, abstracts		
17/10/96	Focus Two	Graduate student research, analysis and reporting, committee reports	Notice of meeting, agenda, minutes		
31/10/96	Focus Two	Research updates, thematic issues	Notice of meeting, agenda, minutes		
06/11/96	PECOS Mgt	Thematic issue workshop, PDF, structure of theses, committee reports, graduate student report, management concerns, milestones	Notice of meeting, agenda, minutes		
14/11/96	Focus One	Health Conference presentation	Notice of meeting		
14/11/96	Focus Two	Plan for data analysis, reporting and write-up	Notice of meeting, agenda, correspondence		

APPENDIX II
PECOS ORGANIZATION CHART



APPENDIX III
PECOS PARTICIPANT LIST 1996

Management Committee

Chair (PECOS PI, Focus 1 and Focus 3 Co-PI, Faculty, Dept. of Soil Science, UofS)
Coordinator (Focus 3 Co-PI, PECOS Public Involvement/Communication Committee Chair, Faculty, Dept. of Biology, UofS)
Member (Focus 1 Co-PI and Chair, PECOS Data Collection and Sampling Committee Chair, Faculty, Dept. of Sociology, UofS)
Member (Focus 1 Co-PI, PECOS Grad Committee Co-Chair, Faculty, Dept. of Agricultural Economics and Centre for Cooperative Studies, UofS)
Member (Focus 1 Co-PI, GIS/Information Systems Chair, Faculty, Canadian Plains Research Centre, UofR)
Member (Focus 3 Co-PI and Co-Chair, Focus 2 Co-PI, PECOS Interdisciplinary Research Course Committee Chair, Faculty, Toxicology Centre, UofS)
Member (Focus 3 and Focus 2 Co-PI, Faculty, Department of Geological Sciences, UofS)
Member (Focus 1 Co-PI, PECOS Grad Studies Committee Co-Chair, Faculty, Department of Sociology, UofR)
Member (Focus 2 Co-PI, PECOS Grad Committee member, Faculty, Centre for Agricultural Medicine, UofS)
Member (Focus 3 Co-PI and Co-Chair, PECOS Grad Committee member, Faculty, Department of Biology, UofS)
Member (Focus 2 Co-PI and Chair, Faculty, Centre for Agricultural Medicine and College of Nursing, UofS)
Member (PECOS Graduate student Representative, Department of Agricultural Economics, UofS)
Member (Study Area Community Representative)
Member (Study Area Community Representative)
Member (Faculty, Centre for Agriculture, Environment and Law, UofS)
Administrative Assistant

Research Focus One

Chair (PECOS Management Committee Co-PI Focus 1, Faculty, Department of Sociology, UofS)
Member (PECOS Management Committee Co-PI Focus 1, Faculty, Department of Sociology, UofS)
Member (PECOS Management Committee Co-PI Focus 1, Faculty, Department of Agricultural Economics and Centre for Cooperative Studies, UofS)
Member (PECOS Management Committee Chair and Focus 3 Co-PI, Department of Soil Science, UofS)
Member (PECOS Management Committee Co-PI, PECOS GIS/Information Systems Chair, Faculty, Canadian Plains Research Centre, UofR)
Member (Faculty, Department of Agricultural Economics, UofS)
Member (Faculty, Department of Philosophy, UofS)

Member (Faculty, Department of Agricultural Economics, UofS)
Member (Faculty, Department of Geography, UofR)
Member, (Faculty, Department of Sociology, UofS)
Member (Agriculture Canada, Swift Current)
Member (Faculty, College of Nursing, UofS)
Member (Faculty, College of Nursing, UofS)
Member (Faculty, Department of Sociology, UofS)
Member (Faculty, Department of Agricultural Economics, UofS)
Member (Community Representative)
Member (Extension Division, UofS)
Students (Two Ph.D, Nine Masters)

Research Focus Two

Chair (PECOS Management Committee Focus 2 Co-PI, Faculty, College of Nursing and Centre for Agricultural Medicine, UofS)
Member (Agriculture and Agriculture-Food Canada, Saskatoon)
Member (PECOS Management Committee Focus 2 Co-PI, Faculty, Centre for Agricultural Medicine and College of Medicine, UofS)
Member (Adjunct Faculty, Department of Psychology and Centre for Agricultural Medicine, UofS)
Member (PECOS Management Co-PI Focus 3 and 2, Faculty, Toxicology Centre, UofS)
Member (PECOS Management CO-PI Focus 2 and 3, Faculty, Department of Geological Sciences, UofS)
Member (Faculty, Department of Pathology, College of Medicine, UofS)
Member (PECOS Management Committee Focus 2 Co-PI, Faculty, Centre for Agricultural Medicine)
Member (Research Fellow, National Hydrology Research Institute)
Member (Faculty, Department of Pediatrics, UofS)
Member (Faculty, Centre for Agricultural Medicine and Department of Community Health and Epidemiology, UofS)
Member (Faculty, Department of Psychology, UofS)
Member (Community Representative)
Students (One Post Doctoral Fellow, Two Masters)

Research Focus Three

Co-Chair (PECOS Management Committee Focus 3 Co-PI, Faculty, Department of Sociology, UofS)
Co-Chair (PECOS Management Committee Focus 3 Co-PI, Faculty, Toxicology Centre, UofS)
Member (PECOS Management Committee Chair and Focus 3 Co-PI, Faculty, Department of Soil Science, UofS)
Member (PECOS Management Committee Coordinator and Focus 3 Co-PI, Faculty, Department of Biology, UofS)
Member (PECOS Management Committee Focus 3 Co-PI, Department of Geological Sciences, UofS)

Member (Faculty, Department of Veterinary Physiology, College of Veterinary Medicine, UofS)
Member (Faculty, Department of Applied Microbiology and Food Science, UofS)
Member (Agriculture Canada, Swift Current)
Member (Faculty, Department of Animal and Poultry Science, UofS)
Member (Faculty, Department of Geography, UofS)
Member (Faculty, Department of Soil Science, UofS)
Member (Faculty, Department of Geological Sciences, UofS)
Member (Faculty, Department of Crop Science and Plant Ecology, UofS)
Member (Faculty, Department of Applied Microbiology and Food Science, UofS)
Member (Faculty, Department of Agricultural and Bioresource Engineering, UofS)
Member (Faculty, Department of Soil Science, UofS)
Member (Faculty, Department of Crop Science and Plant Ecology, UofS)
Member (Faculty, Department of Crop Science and Plant Ecology, UofS)
Member (Faculty, Department of Geography, UofR)
Member (Faculty, Toxicology Centre, UofS)
Member (Dean, College of Agriculture, UofS)
Member (Community Respresentative)
Students (Four Ph.D, Twelve Masters)

PECOS Graduate Studies Committee
Co-Chair (PECOS Management Committee Focus 1 Co-PI, Faculty, Department of Agricultural Economics and Centre for Cooperative Studies, UofS)
Co-Chair (PECOS Management Committee Focus 1 Co-PI, Faculty, Department of Sociology, UofR)
Member (PECOS Management Committee Focus 2 Co-PI, Faculty, Centre for Agricultural Medicine, UofS)
Member (PECOS Management Committee Focus 3 Co-PI, Faculty, Department of Biology, UofS)
Student Representative

PECOS GIS/Information Systems Committee
Chair, (PECOS Management Committee Focus 1 Co-Pi, Faculty, Canadian Plains Research Centre, UofR)
Member (Focus 2 Co-PI, Faculty, Centre for Agricultural Medicine and Department of Community Health and Epidemiology, UofS)
Member (Focus 3 Co-PI, Faculty, Department of Soil Science, UofS)
Member (Focus 1 Co-PI, Faculty, Department of Sociology, UofS)
Member (Focus 1 Co-PI, Faculty, Department of Agricultural Economics and Centre for Cooperative Studies, UofS)
Student Representatives (Two)

PECOS Public Involvement/Communication Committee

Chair (PECOS Management Committee Focus 3 Co-PI, PECOS Management Committee Coordinator, Faculty, Department of Biology, UofS)
Member (Focus 1 Co-PI, Faculty, College of Nursing, UofS)
Member (Focus 2 Co-PI, Faculty, Centre for Agricultural Medicine and Department of Community Health and Epidemiology, UofS)
Student Representative (one)

PECOS Data Collection and Sampling Design Committee

Chair, (PECOS Management Committee Focus 1 Co-PI, Focus 1 Chair, Faculty, Department of Sociology, UofS)
Member (PECOS Management Committee Focus 2 Chair and Co-PI, Faculty, Centre for Agricultural Medicine and College of Nursing)
Member (Focus 2 Co-PI, Adjunct Faculty, Department of Psychology and Centre for Agricultural Medicine, UofS)
Member (PECOS Management Committee Focus 3 Co-Chair and Co-PI, Faculty, Department of Biology, UofS)
Member (Focus 1 Co-PI, Faculty, Department of Sociology, UofS)
Member (Focus 3 Co-PI, Faculty, Department of Geography, UofS)
Member (Focus 3 Co-PI, Faculty, Department of Crop Science and Plant Ecology, UofS)
Student Representative (One)

PECOS Interdisciplinary Research Course Committee

Chair (PECOS Management Committee Focus 3 Co-Chair and Co-PI, Focus 2 Co-PI, Faculty, Toxicology Centre, UofS)
Member (PECOS Management Committee Chair and Focus 3 Co-PI, Faculty, Department of Soil Science, UofS)
Member (PECOS Management Committee Focus 1 Co-PI, Focus 1 Chair, PECOS Data Collection and Sampling Design Committee Chair, Faculty, Department of Sociology, UofS)
Member (PECOS Management Committee Focus 1 Co-PI, PECOS Graduate Studies Committee Co-Chair, Faculty, Department of Sociology, UofR)
Member (Focus 2 Co-PI, Faculty, Department of Pediatrics, College of Medicine, UofS)
Student Representative (One)